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AMERICAN GAS JOURNAL

Established 1859 Pioneer of the Gas Industry

Manufactured and Natural Gas

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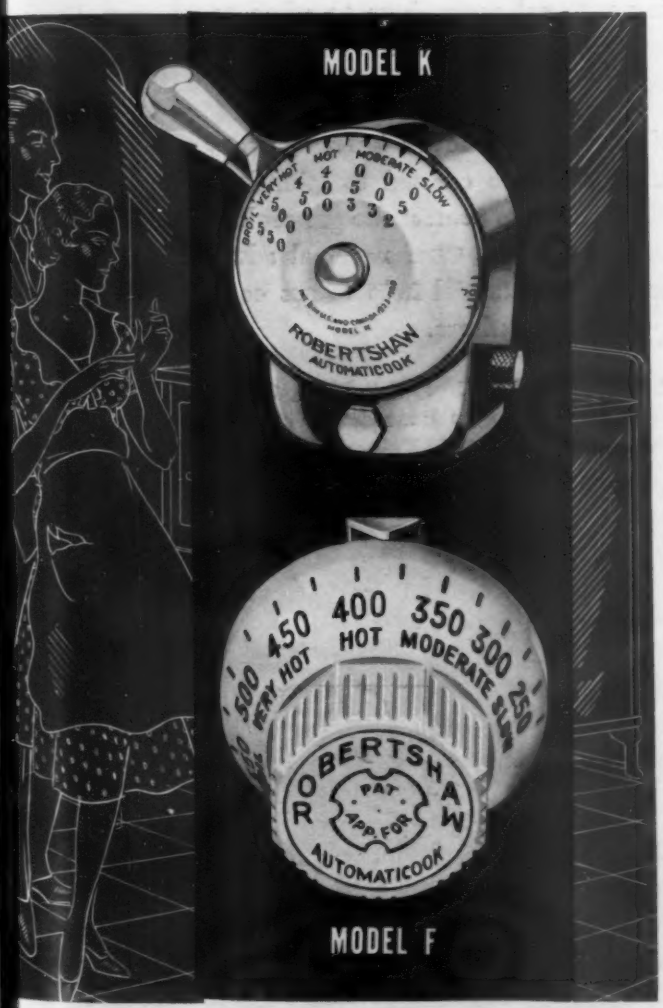
ROBERTSHAW



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Magic Chef

AMERICAN STOVE COMPANY

(Look for this Trade Mark)

AMERICAN
GAS JOURNAL
Established 1855 *Pioneer of the Gas Industry*

Manufactured and Natural Gas

Executive and Editorial Offices, 53 Park Place, New York City

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TABLE OF CONTENTS

As We See It 7

Gas Compression Problems—And How One of Them Was Solved by Use of The Gas Engine—Walter M. Russell .. 9

A Reconditioned Gas Line in California Rebuilt With Welded Joints—Wallace A. Sawdon 12

What of the Future for Gas Househeating?—O. J. Kuenhold 14

Notes on High Pressure Gas Distribution 17

Operating Trends in New England—Horace G. Taylor 22

Sales Floor Displays—Stuart Bratesman 27

Effective Advertising Appeals 28

Pushing Up The Sales Curve 29

Future Sales Effort of The Gas Industry—Walter C. Beckjord 31

Tapping A Large Gas Line Without Interrupting Gas Flow 36

Elements of Gas Technology 37

Third Southwest Natural Gas Sales Conference Supplies Valuable Information 39

Mid-West Regional Gas Sales Conference 40

Papers and Addresses at New England Meeting Show Gas Industry Getting Down to Business 43

Personals 46

INDEX TO ADVERTISERS, PAGE 50

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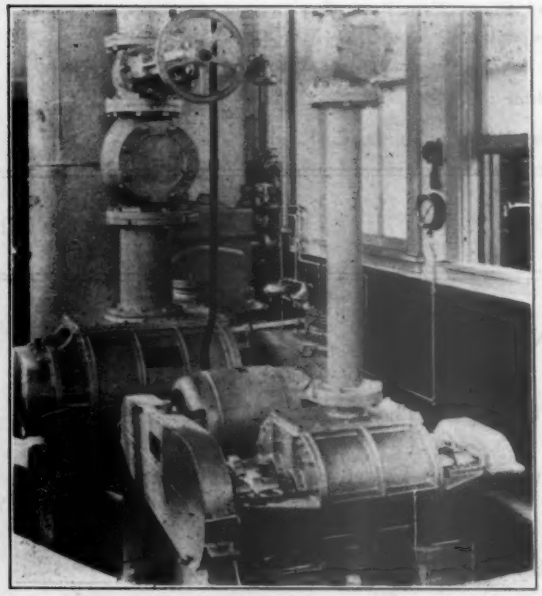

R-C-W Blower and Exhauster being used for proportioning at San Diego, Calif.

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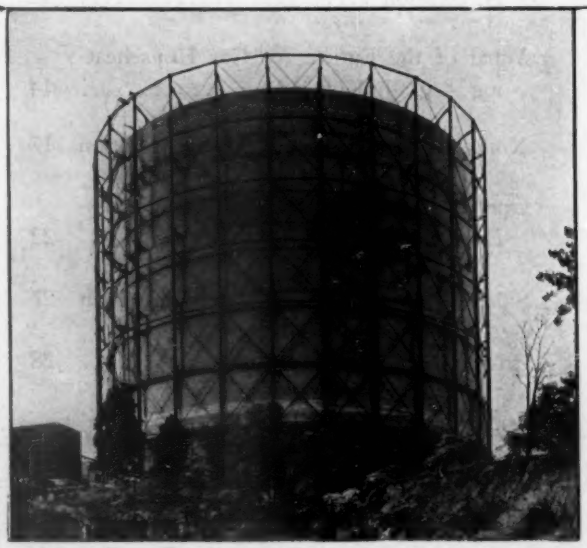

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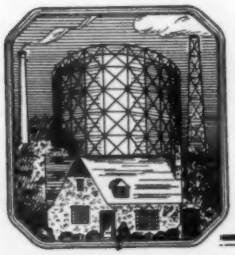

As We See It

Oil To Customers in Pipes

RECENTLY there appeared in a New York newspaper an item having to do with an application on the part of an organization, for a franchise to install a system of piping for carrying oil to domestic customers in a thriving Long Island community. The company seeking the franchise seems to have made something of a study of the possible field and, in addition to the claim that four thousand prospects have agreed to avail themselves of this oil service, a rather complete plan is stated to have been rounded out.

This plan, it goes on to say, calls for the installation of oil burners for house-heating, cooking and water heating, such equipment to be supplied by the company and serviced on a monthly rental basis. Provisions for equipping each customer with an oil meter, automatic regulating devices, and other necessary apparatus are included. In other words, the scheme plans for a distribution system for supplying oil quite similar to a gas distribution system.

Perhaps the economies of the plan are not feasible and also, the matter of obtaining a franchise might not be as simple as it reads; but, in any case, the proposed arrangement should serve to open our eyes to the fact that the oil fellows are doing some figuring on a pretty comprehensive scale, and, in times such as these, well laid plans for effecting economies in living costs might be put across, regardless of their ultimate worth to the user.

Such a scheme for supplying fuel energy might effect economies over a relatively short period but in the long run would operate in an opposite manner. Gas supply is figured on a long run basis and the customer and city fathers should be guided almost exclusively by this fact.

Forewarned Is Forearmed

THE disastrous holder explosion in Neunkirchen, Germany should cause gas companies in our country to review their fire prevention precautions and fire fighting equipment to the end that, first: fire hazard in their plants will be assuredly kept at a minimum and second; fire once starting, will be kept under control and extinguished.

It is somewhat beside the main point that fire starting in the benzol department caused a rupture in an overhead gas main, the flames from which played about the holder causing a buckling in the holder plates, thereby giving rise to an explosion. All of this is essentially "water over the dam" and, while we sympathize deeply with the victims and the gas company, and notwithstanding that none of the plant apparatus was inherently at fault, still we must see to it that similar catastrophes in this country will be beyond the bounds of reasonable possibility. Proper fire fighting equipment, men properly drilled in fire fighting and everlasting precaution will go far to obviate such happenings.

Let's Become Acquainted With Our Customers

OUR industry has long prided itself in the fact that it enjoys a very intimate relationship with its customers, both domestic and industrial; that is, there exists a mutual confidence which is fostered by the recognized value of the service rendered and the friendly spirit which is back of such service. But, are we doing a hundred per cent job in this connection, and if not, what remains to be done? Let us examine some facts.

Assume a selection at random of one hundred customers in your territory; and for purposes of this especial argument, let them be domestic users of our service. What personal contact takes place between the gas company and each of these customers? We believe the answer can be supplied out of hand without much consideration. First, a meter reader visits the customer once a month. He rings the door bell and with little or no conversation enters the cellar, and, most frequently, leaves the premises without the housewife noting his departure.

What thoughts, if any, are engendered in the mind of the customer by reason of this visit? Perhaps some similar meditation to this flashes through the customer's head. "The meter reader again. Soon will come another bill. I'd better watch the gas consumption." By and large, then, this meter reader contact at best has but a neutral effect.

Calling at the gas company office is a comparatively infrequent occurrence on the part of the customer. He or she, especially in the case of the customer in the better neighborhoods, pays the bill by check and is not particularly prone to visit the office otherwise. If the average customer calls at the main office once or twice a year that is about the extent of her activity in this connection. And, even if these visits could be considerably increased, they would not constitute as good contacts as those made in the home.

The next contact to consider is that made by a salesman. If he is a good salesman he will endeavor to sell the customer along legitimate lines, which need no elaboration in this discussion. If he is one of those rare salesmen who might be described as a domestic gas consultant, he will go into the use of gas in the particular household in a very intimate way. He will know ahead of time the living habits and personal traits of such a family. He will know something in advance of the income of the bread winner, what use he has made of gas service, and whether he should be in a position to amplify such service. In general, this type of salesman will be a household consultant in the strictest sense and—he will make sales without scarcely trying. Here, then, lie excellent opportunities for customer contact that will yield handsome returns to the company and the customer as well. But—we know personally that many housewives would show some reluctance to going into the necessary detail with a male representative of the gas company. And so, we come to the consideration of the home service worker.

Here is the method of making contacts that will lead to wider use of gas and even better service, to say nothing of increasingly pleasing relations. Here, we feel, is an answer to that portion of Mr. Backjord's fine paper read before the recent meeting of New England Gas Association, which had to do with pointing out that some method must be evolved to bring us closer to our customers. However, if we are to accomplish much with the home service worker, we must make more calls and more calls mean more home service workers. And, we suspect at this point that the gas industry is distressingly understaffed with home service workers. service activities. In this regard let us select as home service workers women of the highly educated affable type; women who will continually study the relation of changing living cnoditions to the service which we have to offer; employees who will quickly translate a fad that gives promise of becoming an institution into terms of widened gas usage. Who knows but that the next decade might see the home service worker not only giving advice as to better living but actually making appliance sales as well.

Make no mistake, progress in the direction indicated will be in direct proportion to our intelligent use of home service work. Here is one solution to our problem of getting better acquainted with our customers.

NOW

Model T-33
(3 Ton Range)
$1225
F. O. B. Pontiac

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(4 Ton Range)
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"257" Valve-in-Head ENGINE

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Vol. 138 No. 3

March, 1933

AMERICAN GAS JOURNAL

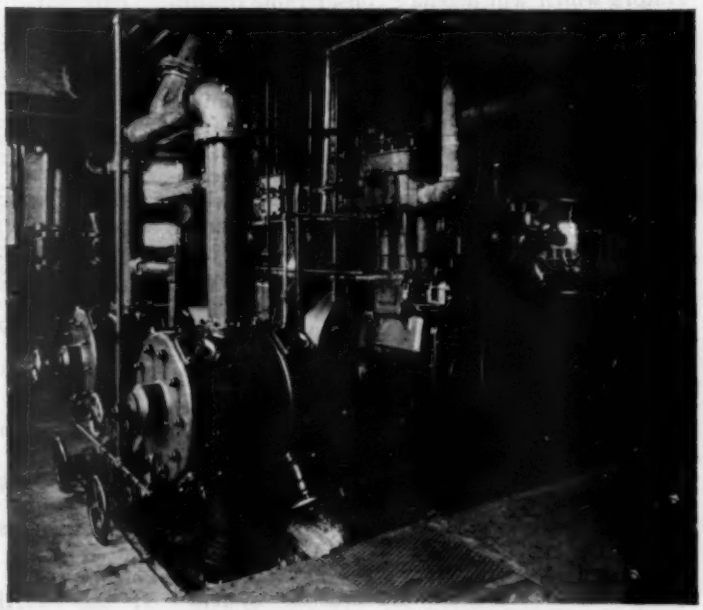
Established 1859 Pioneer of the Gas Industry

HENRY M. RILEY

Editor

Gas Compression Problems -- And How One of Them Was Solved by Use of The Gas Engine

WALTER M. RUSSELL



Gas Engine Driven Gas Compressor Installation

IN the past ten years the compression of gas in large quantities by manufactured gas companies in the distribution of their product has become a commonplace. Where a few years ago only a few companies compressed to a point above five pounds, pressures of fifty pounds are frequently found. The volumes of gas which require compression have also greatly increased, so that companies which used to send out only a small proportion of their gas at higher than holder pressures are now pumping sixty per cent of the output. The need for meeting large peak loads created by the development of the house heating business has been instrumental in developing this condition. The ease with which large peak loads are met by handling city distribution through belt lines serving district governors has made compression of almost the entire output of many large gas companies economically attractive.

The demand on the part of distribution engineers for higher pressures has given the plant engineers new problems. The first step in getting higher pressures out on to the city often took the form of an isolated distribution line or pumping line fed from a fan, motor or turbine driven, operated over the peak loads. For somewhat higher pressures, blowers of the Roots type were used, usually direct connected to steam engines

The use of high speed turbine driven fans for water gas blowers often attracted gas engineers to this type of compressor for gas distribution and many installations of such blowers have been made, with increasing pressures from year to year, so that now one frequently sees turbine or motor driven centrifugal blowers delivering gas at pressures up to fifty pounds. There is no standard method of solving the compressing problem, even as regards the use of steam as a prime mover or the type of compressor.

Reason For Variety of Units

At the New Haven coke plant where gas is compressed to send all the way up the Connecticut valley to Hartford much use is made of steam engine driven reciprocating gas compressors. At the very modern new plant in Brooklyn, motor driven centrifugal compressors are used and a great deal of money was spent on electrical control equipment to permit of variable speeds. In some large gas plants a variety of units are often seen, including fans, steam driven reciprocating

MAR 16 1933

compressors engine driven Roots type blowers and turbine driven centrifugals. Local conditions usually govern the type of unit and as the system grows, with changing conditions one type of unit may suit for one year and something radically different the next time.

In water gas plants the question of steam is often of paramount importance. Nearly all large water gas plants now have steam accumulators which have greatly improved the heat balance of the plants and have in many cases eliminated all surplus exhaust steam. If a plant has limited boiler capacity and no surplus exhaust steam, the use of purchased electricity is often very satisfactory as the investment can thus be kept down and a desirable steam balance remain undisturbed.

Usually however, steam conditions in a water gas plant are far from ideal and offer opportunities for the use of mixed pressure turbine driven machines. This may be particularly true in plants using water jacketed mechanical generators which will produce considerable quantities of low pressure steam even under the very best operation and often a use for this low pressure steam is not easy to find. A turbine which will operate on low pressure steam or high pressure steam equally well, changing from one to the other automatically, is very useful under these conditions. The fullest development of this type of equipment involves taking either high or low pressure steam, or running on high pressure steam and bleeding off low pressure steam from the lower stages of the turbine, running condensing under any of the different cycles.

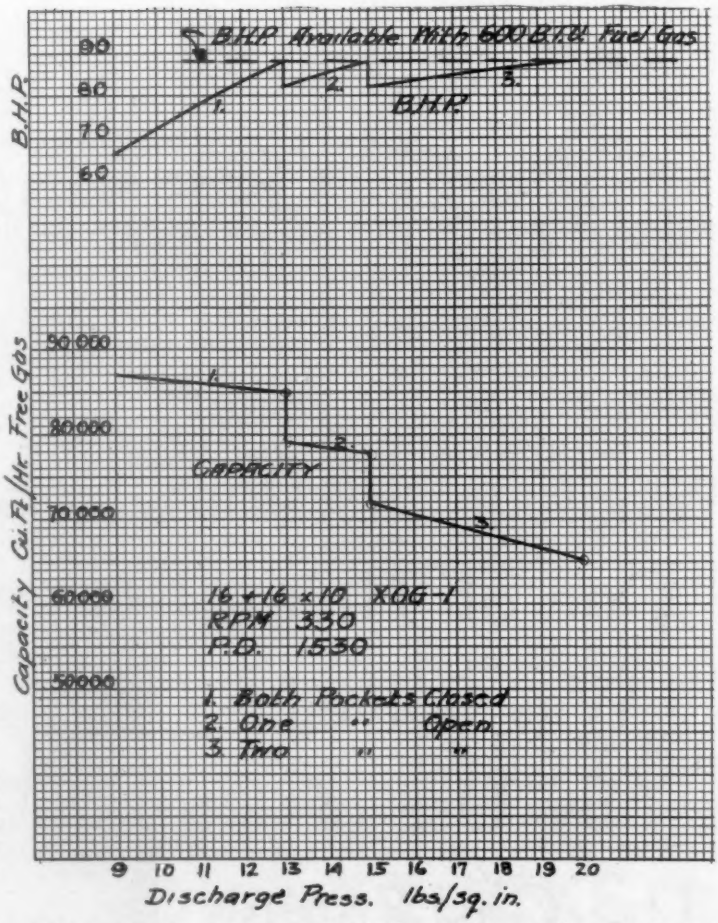


Diagram Showing Performance of Unit and Effect of Clearance Pockets

This type of machine has been used in a number of water gas plants with very good satisfaction, where the supply of exhaust steam is not sufficient at certain times of the day for gas making and at other times of day is in excess of gas making requirements. When there is an excess of exhaust steam, the low pressure stages of the turbine "accept" exhaust steam and utilize it. When there is a deficiency of exhaust steam the turbine "rejects" a portion of the high pressure steam and delivers it at exhaust steam pressures to the steam accumulator system. If the supply of exhaust steam is insufficient, the high pressure steam is accepted by the turbine in such quantities as is required for operation. This governing problem is further complicated by the usual demand on the part of the gas engineer for varying pressures and volumes. To meet these conditions governors have been developed which permit of governing the gas pressure on the outlet of the centrifugal compressor by simply adding a weight or removing a weight from a lever arm, irrespective of the method of using steam available at the moment. The governor design problem is, of course, very complicated, but the governor used in this service is a very rugged device and its regulation by the operator is very simple and, if kept clean and well oiled, is not likely to get out of adjustment.

The use of gas as a fuel for producing power for gas compression has not received the attention it appears to deserve in manufactured gas plants. There are a great many plants where the conditions are very favorable for the use of gas engines in driving reciprocating compressors. In the natural gas business gas engines have been used very extensively but conditions are very different in that the volumes are relatively very large, the pressures usually high and the fuel relatively cheap.

In manufactured gas plants the cost of the gas is usually sufficiently high to make the use of gas as a fuel of doubtful economy unless investment conditions influence the decision. There are occasionally, however, situations where the use of gas engines is definitely indicated.

Boiler Capacity Being Utilized

About two years ago one of the large Eastern gas companies encountered conditions which pointed directly toward the use of gas engines. The load on the boiler plant was such that it was not desirable to add anything to the use of steam. Plans under way involved additions to the boiler plant at some time in the future and to make any boiler plant additions in advance of schedule would be uneconomical. Other plans involved large additions to the pumping equipment a year or two ahead. In the meantime one district of the large and diversified territory served needed a considerably increased supply. In effect, an insignificant part of the distribution system could easily have caused the advance of a very large part of a future comprehensive plan at an inopportune time. The problem was solved by the use of a gas engine driven compressor.

The equipment selected was a direct connected, gas engine driven duplex gas compressor. This type is equipped with two vertical power cylinders 12" bore by 14" stroke and two horizontal, double acting compressing cylinders 16" bore by 10" stroke. The machine has a displacement of 1530 cubic feet per minute when running at 330 RPM. The fuel gas available was of 600 b.t.u. per cubic foot and on this the engine will develop 90 BHP with quite good economy, using at full

load 10,500 b.t.u. per BHP hour and at three-quarter load 11,300 b.t.u. per BHP hour. The compressing cylinders were designed for a maximun. normal discharge pressure of 15 lbs. per sq. in., but under certain conditions can operate at 20 lbs.

One of the disadvantages claimed against this type of machine is its lack of flexibility as compared with a steam driven machine. Gas compressors serving distribution systems have to contend with a widely varying load. This machine was equipped with hand operated clearance pockets in each outer head and each cylinder contained two hand operated valve lifters. In addition to this, the engine was equipped with an automatic speed and pressure regulator which was easily set for a desired pressure. One valve lifter would reduce the capacity of one cylinder by 50%, or the total send out of the machine by 25%. This feature together with the clearance pockets and the speed and pressure control, gave a flexibility which left little to be desired in operation.

The diagram illustrates very clearly the possibilities and performance of the unit. It also shows the effect of the clearance pockets which vary the capacity through rather wide limits and, as stated, the use of the valve lifters gives still further range in capacity.

When running with a delivery of about 85,000 cubic feet per hour against fifteen pounds pressure, about 1600 cubic feet of gas per hour are required. If the cost of this gas can be taken at twenty-five cents per thousand, the operating fuel cost would be about 40 cents per hour. Taken in conjunction with the low cost of the unit as compared with an equivalent capacity in steam driven equipment allowing for the boilers required, the financial advantage of the gas driven machine is very considerable. Where excess boiler plant is available and no need for it in the immediate future it would require careful figuring to make a decision, but in this case, considering all the intangibles, there is no question but what the gas engine furnished the best solution of the problem.

Oil and Natural Gas Situation in Michigan

SIXTY-NINE new producing oil wells and three new natural gas wells have been completed in the Central Michigan area in the half year period since July 15, 1932, according to a review of the oil and natural gas situation in Michigan recently issued by the Utilities Information Bureau.

The 69 new oil wells had an approximate initial open flow of 35,000 barrels per day. They increased the total number of wells which have produced oil in the Central Michigan area to 334. Average daily oil production of Michigan fields during the last half of 1932 ranged from 20,000 to 24,000 barrels.

The 3 new natural gas wells were all in the Broomfield pool. They added 9,732,000 cubic feet to the estimated daily open flow of the Broomfield pool, but little to the proved acreage or indicated reserves.

High spots among developments in the Michigan oil situation include the striking of oil in the exploratory well, Yost No. 1, in Section 35, Greendale township Midland county, opening up what is believed to be a new pool several miles southeast of the so-called Greendale Extension; the advancement of the price of Central Michigan crude oil to 95 cents per barrel; and the successful use of a new acid limestone solvent treatment which has greatly increased the flow of many old and new wells.

Chief among the developments in the natural gas situation have been the completion of the commercial test of the Broomfield pool which resulted in the offer of Consumers Power company to supply natural gas to Bay City and Saginaw; the awarding of a permit to the Michigan Natural Gas Corporation to construct a pipe line from the Central Michigan area to Bay City and Saginaw; indicated extension of Broomfield pool boundaries by a non-commercial show of gas in Fritz No. 1. two miles southeast of the proved field; extension of the Vernon gas pool by like non-commercial shows of gas in Section 23, Vernon township, and Section 1, Isabella township, both in Isabella county; failure to find gas in test wells drilled between the Fritz well in Section 13, Broomfield township, Isabella county, and the Elba township pool in Gratiot county; and failure to find gas northwest of the Broomfield pool.

The total open flow of the Broomfield, Vernon, Clara, and Elba gas pools estimated on initial flow, is given as 104,529,000 cubic feet per day, with an allowable daily withdrawal of 26,743,000 cubic feet. The proved acreage is given as 5,125 acres, and the estimated reserves as 13,077,200,000 cubic feet and upwards. At a daily withdrawal of 26,743,000 cubic feet, reserves of 13,077,200,000 cubic feet would be exhausted in 490 days, while reserves of 24,000,000,000 cubic feet (estimated by some geologists and engineers) would be exhausted in 900 days.

Plans For Stimulating Domestic Gas Load

ONE of the most intensive programs of sales and promotional effort in the domestic field in the history of the gas industry is being planned under the direction of the National Directing Committee of Executives, created especially for this purpose by the American Gas Association.

Conrad N. Lauer, president of the Philadelphia Gas Works Company, has been named chairman of the committee to lead this campaign, which is expected to stimulate business conditions in the domestic heating and cooking market throughout the United States.

A number of leaders of the gas industry have felt for some time that this particular phase of its activity has been too conservatively handled as a whole, and the industry has failed to utilize highly organized methods of informing housewives and others of the economy and efficiency developed in modern gas appliances for the home.

Recently, upon the recommendation of a subcommittee, the National Directing Committee of Executives employed the advertising firm of N. W. Ayer & Son to outline a program of coordinated advertising and sales promotion effort, which will be placed before Mr. Lauer's committee in the near future.

"Nobody believes that it is possible to standardize on the policies and practices of the member companies of the American Gas Association in developing the sale of gas," said Mr. Lauer, "but there certainly has been an evident feeling that more aggressive and better coordinated sales policies are essential to the gas industry.

"The program I have in mind would be aimed not to supplant, but to supplement and round out the present advertising and sales activities of member gas companies with those of a promotional nature, telling and selling the story of modern gas service to the public in a unified way."

A Reconditioned Gas Line in California Rebuilt With Welded Joints

WALLACE A. SAWDON
Petroleum Engineer, Los Angeles

Arc-Welding Reconditioned Gas Line

AMONG the many problems of natural gas transportation, that of pipe line maintenance is not the least. The soil in which a line is laid is frequently the cause of greatest trouble and has long been the subject of considerable study with an aim toward eliminating deleterious effect on the pipe itself. Maintenance however, may run from a few periodic or emergency repairs to a complete replacement of the line. Under certain circumstances a line may be reconditioned to cut down constant repairs or to accomplish an extensive repair job that will eliminate the necessity of replacing the line throughout. Several sections of line have recently been reconditioned in California that have involved some interesting features; and in one particular case a coupled line has been transformed to a welded line after many years of service.

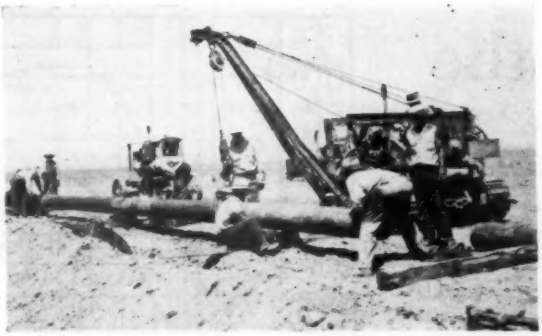
This recondition section is a length of about thirty-two miles of a 12½-inch gas line carrying gas from Buena Vista Hills to Los Angeles and lies in a desert area north of Grapevine which is at the southern extremity of the San Joaquin Valley. It was built in 1912 and has been used almost constantly by the Southern California Gas Company for the last twenty years. During this period the couplings were re-gasketed once, the coupling bolts were tightened once and more than five hundred leaks have been repaired. The area through which it passes is subject to mountain rains and desert winds that have been instrumental in uncovering the line for several hundred feet in some parts and in depositing additional covering in others.

It became necessary, however, to rebuild the line and the decision was made to remove the weakened pipe in places where it was found to be in bad condition and to weld the joints instead of replacing the couplings. As a whole, the pipe was found to be in fair condition with certain portions showing more deterioration than

Making A Pressure Test on The Line

Care Was Necessary in Pulling Pipe from Ditch

others. The soil for the most part, however, was dry and considerably less external corrosion was found than could be expected in the average installation. A small amount of internal corrosion naturally was at low points where water had a chance to collect and some pitting was found at the ends of the joints under the couplings. The line had been coated when it was laid but the protective coating was found to be of little value when the line was pulled out.



Lining Up and Tack-Welding Before Reconditioning

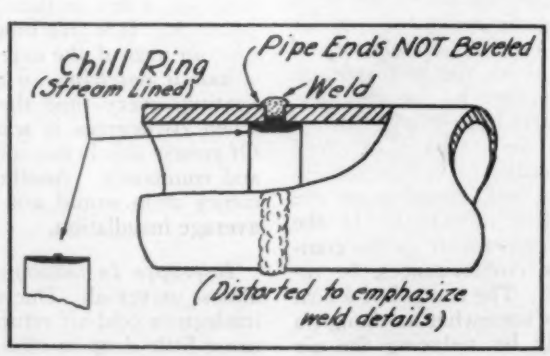
Most of the work of reconditioning and rebuilding the line was done by hand labor and gave from 125 to 150 men employment during a time when employment was badly needed. Yet the work progressed at the rate of approximately 4000 feet a day while using only two tractors with side booms besides the necessary trucks for hauling skids, materials, generators, etc. The cleaning crews consisted of 26 men each and two of these worked from 5 p.m. to 1 a.m. and from 1 a.m. to 9 a.m. These night shifts were necessary since the heat encountered during the day made what was left of the original protective coating so soft that it gummed up the tools and prevented effective cleaning of the pipe except at night. Actual machine work consisted only of ditching and backfilling.

The position of the pipe was closely located by a crew which preceded the ditcher. This machine then uncovered the pipe to an inch or so above its top and was followed by a spotter crew which completed the excavation to a point just below the upper surface of the line. It was the duty of this crew to provide a place for the tongs to grab the pipe and for that purpose the crew excavated holes around the line every thirty to forty feet.

In raising the pipe out of the ditch, care had to be taken to keep the ends from being bent since the line would bend sharply at the couplings. With the pipe raised, it was then placed on skids and pulled back from the ditch for a distance of four or five feet. The couplings were here cut with an acetylene torch on one side only, the one cut going through the gasket, center rings and followers in a single operation.

As soon as the couplings were driven off, the lengths of pipe were carefully examined both inside and out and those not in a satisfactory condition were marked for replacement. In many portions of the section of line being reconditioned there would be continuous lengths that could be rejoined very satisfactorily; at other places, quite a few joints would have to be replaced. Soil conditions alone were probably not responsible for this and in many cases the internal corrosion that weakened the walls of the pipe was due to water that had collected there. All ends were immediately filed and cleaned with a wire brush.

The pipe was a plain end without level and the joints were welded by the electric are process by means of using a chill ring. Details of the joint used are evident in the sketch which is not drawn to scale but which brings out the features of the welding method. The chill ring has a welding dam extending along its center around its outer perimeter. This dam is only 1/16 inch high and therefore does not protrude to the top of the pipe. The sample furnished for the job was according to these specifications but when the supply was received on the job, the dam was found to be 3/16 inch high and had to be cut down to the desired height. The chill ring assisted in stabbing the pipe and in keeping the joints at the proper distance apart as well as functioning in the actual welding process. While the chill ring cuts down the inside diameter of the pipe a fraction of an inch, it is streamlined and is felt to have little or no influence on the capacity of the line.



Details of Joint

The chill rings were inserted by the line-up crew which prepared the pipe for welding by replacing worn lengths with new and by tack-welding the joints after placing sections of the line on skids and dollies. The firing line then arc welded the line into strings of from three to four hundred feet each.

The reconditioning work was done after the welders had finished making up the three to four hundred foot sections of the line. The pipe was thoroughly cleaned with oscillating tools, wire brushes, scrapers and chipping hammers and put into the best condition possible for the protective coating which was then applied. This coating was, of course, preceded by a primer.

The strings thus completed were then tied into sections of a mile or two in length and given a first test. This consisted of the application of about 100 pounds per square inch by a portable air compressor. Each weld was also subjected to a bubble test from a light primer applied at the joint.

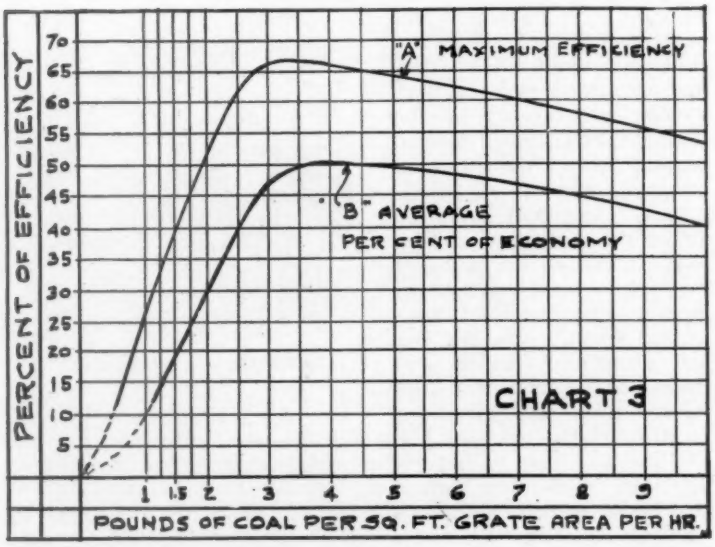
After each section was thus tested it was lowered into the ditch and backfilled, subject to a working pressure test of 400 pounds per square inch. Gate valves and cross overs to an adjacent line had to be reconditioned or replaced as the final operation for the completed line which was returned to service during the month of September.

Since the cleaning of the pipe had to be done at night, a lighting plant with its portable generator was installed. A field office with telephone connection was also set up on the job and, being mounted on skids made of pipe was pulled along the line as the work advanced in order to be right on the job at all times.

Other gas lines with more or less replacement of pipe are in the process of reconditioning in the state. In one of the accompanying photographs is shown a vacuum test being made on a welded line in the Kettleman Hill Field. This line, however, was originaly arc welded with the bell and spigot type of joint with welding dam on the spigot end and will naturally be reconstructed with the same type of joint.

What of the Future for Gas Househeating?

O. J. KUENHOLD



(Continued from February issue)

Cost of Coal Furnace Heating

THE efficiency of coal furnaces varies widely according to the rate of combustion. Curve A in Chart 3 gives a characteristic efficiency curve. The vertical lines show the rate of coal combustion per square foot of grate area, the horizontal lines indicate the efficiency, based on heat delivery into the warm air ducts compared with coal input in B.t.u.'s.

This curve A, however, represents the highest efficiency, reached when a good furnace in good condition is expertly fired, with clean flues, proper coal, correctly installed with adequate size warm air ducts and cold air return. In other words, the curve A is the efficiency at various combustion rates under ideal conditions.

Note that the maximum efficiency is reached at a combustion rate of approximately 3 to 4 pounds of coal per square foot of grate area. When the combustion is beyond this "best" rate, the efficiency curve slants downward, dropping from 67 per cent to about 55 per cent at a 9 lb. combustion rate. When the furnace is checked down to consume less than the "best" combustion rate, the efficiency curve plunges down rapidly, so that when operated at mild weather combustion rate the efficiency is very low.

The above characteristic of coal furnaces is of great importance to the gas industry because it opens an opportunity for the use of efficient gas auxiliary furnaces to do the heating in the milder weather at a cost comparing much more favorably with coal than in colder weather, when the coal furnace is at its best efficiency.

The reason for the big efficiency drop of coal furnaces as shown by curve A Chart 3 is easily accounted for. A domestic coal furnace is really a rather inflexible sort of a heater. At combustion rates above the best rate, an increased percentage of heat escapes to the chimney. To reduce the combustion rate and heat delivery below the best rate, the fire must be choked—that is, deprived of adequate air supply. This results in visible and invisible gases liberated from the coal, escaping up the chimney without being completely consumed. If the checking is long continued, the temperature in the combustion zone may, under certain circumstances, be reduced below ignition temperature. The control of a coal fire by checking the air supply is somewhat as though a gas fire were controlled entirely by reducing the air supply instead of the gas supply.

Besides the drop in efficiency due to the influences above described, there are other influences occurring in average installations which reduce the average operating efficiency down to that shown by curve B Chart 3. This is called an "average per cent of economy" curve, because certain losses enter which are not, strictly speaking, losses of efficiency. Among these average service losses are the following:

Soot Deposits—The normal state of the average furnace is to have the flues more or less coated with soot. Soot is a splendid heat insulator. It can easily cause a drop of 15 per cent in efficiency at "best" firing rate. The per cent of loss increases considerably at the left hand end of the curve where the generated heat is low, and is less under high combustion rate; an average loss of 3 to 5 efficiency points may reasonably be assumed, doubling at the lower combustion rates.

Unskillful Stoking—The average person has very little knowledge of scientific stoking nor does he care to take time for the careful and frequent stoking which efficient operation demands. The skill required is increased when operating the furnace in the checked condition which mild weather heating demands. We can therefore assume for the average furnace an additional drop in efficiency about the same as for sooted flues. This loss will of course vary at different times, but we are assuming average operation.

Avoidable Overheating—This is distinct from unavoidable overheating which is separately considered. It refers to periods of overheating due to lack of care in checking a fire in time to prevent excessive room temperature. It is this loss which thermostats correct. To give an idea of the extent of this very common loss: In a month requiring an average of 30 degrees of overheating, every time the room temperature rises to 75 when 70 degrees is wanted a 16⅔% loss is incurred. Of course this is not continuous but it occurs frequently and commonly. Another point or two in average efficiency drop would not be far out of the way for the average installation.

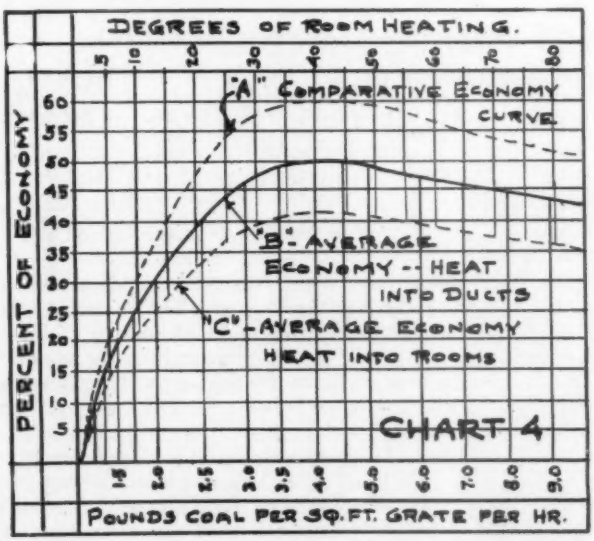
Improper Installation—This is so common as to be almost universal. Ducts too small, no cold air return or inadequate cold air return, improper arrangement—these cause little drop in efficiency under mild weather operation but show up strongly in the colder weather, when

fast air circulation is a necessity. In other words, improper installation of ducts has little influence upon heat distribution from a gas auxiliary furnace during mild weather. It has no appreciable effect upon the left hand end of the efficiency curve A.

Inferior Furnace—This is a quite common condition. It includes not only cheap furnaces with inadequate heating surface, but furnaces in poor condition, such as with leaky joints, cracked fire bowls, and warped doors. All these admit air and make it impossible to properly check the fire. These are very common, as every furnace man knows. An average of a point or two drop in efficiency is included for this condition in arriving at curve B.

Poor Coal—Poor or unsuitable coal is not considered in curve B, because it is a condition which can be remedied.

A careful analysis of the above common causes of lowered operating economy of average furnace installations results in curve B. Some of the losses may be greater than assumed and some less, but it is thought that curve B has a very reasonable basis. Actual experience seems to prove the above. It must be clearly understood that curve B represents an average and is subject to variations, not only as a whole but as to the exact location of the line at the lower end, the latter varying considerably with the kind of coal employed.


DEGREES OF ROOM HEATING.
"A" COMPARATIVE ECONOMY CURVE
"B"-AVERAGE ECONOMY -- HEAT INTO DUCTS
"C"-AVERAGE ECONOMY HEAT INTO ROOMS
CHART 4
PERCENT OF ECONOMY
POUNDS COAL PER SQ. FT. GRATE PER HR.

Curve B of Chart 4 shows curve B of Chart 3 arranged so that practical use of it can be more easily made. With this end in view the curves shown are laid out on a basis of the degrees of room heating being divided into equal spaces. This unequally spaces the rate of coal combustion. Here again careful study was made in order to reach an average. In a furnace large in proportion to the house the degrees of heating scale would be condensed toward the left, causing lower efficiencies at lower degrees of room heating. Curve B seems to check up as closely as can be expected when compared to cases where a gas furnace of known efficiency has replaced a coal furnace, and back calculations are made to determine what the average operating economy of the coal furnace must have been. The average of such cases indicates an apparent average efficiency for coal furnaces in the neighborhood of 40 per cent. The average efficiency shown by curve B of Chart 4, obtained by reading the efficiencies 5 heating degrees apart from 5 to 65 degrees and dividing by the number of readings, is 42 per cent. This tends to prove the accuracy of this curve upon which the coal-cost calculations which follow are based.

Similar comparisons can be made by gas heating engineers in order to verify the accuracy of the chart as reflecting average coal furnace performance. It does not seem possible that the chart can be greatly in error within the limitations of "average" performance.

Curve C of Chart 4 allows for heat losses into the basement from ducts.

Curve A of Chart 4 is a special curve, used in comparing coal costs with gas costs which are calculated according to the formula previously given on B.t.u.'s of gas input required to heat a given house. The said formula includes allowance for gas furnace stack losses and casing losses. To avoid inclusion of these losses twice in simple comparison coal cost formulas to be given, these losses are deducted from the losses shown by curve B and curve A is the result. Curve A therefore allows for those coal furnace losses which are over and above the losses of good gas furnaces. The column of coal cost factors in Table 1 are based on curve A. The reason for the above method of handling will be more clear later. It makes it much easier to make direct comparison of coal and gas costs.

Table 1—Coal Cost

Degrees of Heating	Coal Cost Factors: Heat Del'y to rooms	Coal Cost Factors: Comparative	Lbs. Coal per sq. ft. per hour
A	B	C	D
80	98,000	140,000	9.1
70	101,000	146,000	7.7
60	106,000	154,000	6.3
50	110,000	159,000	5.1
40	112,600	162,000	4.0
35	110,000	159,000	3.6
30	107,000	154,000	3.2
25	99,000	146,000	2.8
20	88,000	127,000	2.4
15	74,000	108,000	2.2
10	57,000	81,000	1.6

Use of Table 1

To Get B.t.u.'s Delivered into Rooms per 1c

(6) Divide the Act Coal Cost Factor (in colume B) opposite the degrees of heating being done; by the cost of the coal in dollars per 2000 lb. ton.

Compare this with similar gas costs given by formula 5. (See page 24 February issue.)

To Get Comparative Coal Costs in B.t.u.'s per 1c

(7) Divide the Comparative Coal Cost Factor (in column C) opposite the degrees of heating being done by the cost of the coal in dollars per 2000 lb. ton. [Remember that this figure is 20 per cent too high but that this is corrected when employed with gas cost formula 1 (see page 24, February issue) and formulas based thereon, which would otherwise give results 20 per cent too low.]

To Get Actual Coal Costs per Degree Hour of Heating

(8) Divide the required B.t.u.s per degree of heating, derived by gas cost formula 1; by the above Comparative Coal Costs in B.t.u.s per 1c. This will give costs under continuous furnace operation. Costs for part day heating are given further on.

To Get Coal Consumed by Use of Column D

(9) Find proper grate area for the house and multiply by the pounds per sq. ft. of grate per hour. This rate will vary according to the grate area of the furnace relative to the house. The figures given are handy for checking other calculations. At 70 degrees of heating the coal consumption would be 7.7 lbs. per sq. ft. per hour.

There is a limit to how few degrees of room heating

down to which a coal furnace may be checked continuously. This low limit depends in part upon the furnace, how air tight its fire bowl is, how well the doors fit, its size compared to the size of the house, the kind and grade of coal, the skill of the operator and how much time and frequency of attention he is willing to give to the furnace. It is safe to say that in average cases and with ordinary good bituminous or semi-bituminous coal, the lowest combustion rate is 1¾ to 2 pounds of coal per square foot of grate. If the furnace is checked lower than that for extended periods, as overnight, the chance of the fire dying out entirely is considerable. Reference to curve B Chart 4 shows that this is equivalent to about 9 to 13 degrees of heating.

In view of the above, the least heating which a coal furnace can do may be assumed at 10 degrees in continuous heating for the entire house and when the requirement is for less heating, some overheating must be done.

Building a coal fire costs more than is generally imagined. The smallest fire which can be built and maintained for any length of time requires at least 6 inches depth of bituminous or semi-bituminous coal—somewhat more for anthracite coal. A shallower fire can be built and maintained but it requires more skill and careful nursing than is usual. As we are dealing with averages, it is not safe to figure on less than 6 inches depth of coal for a temporary fire, to heat for an evening for instance, but extinguishing during the night.

Loose coal may be assumed to weigh 50 pounds per cubic foot. On that basis, Table 2 shows the least weight of coal required to start a temporary coal fire. From this the cost may be easily calculated for any price of coal.

Table 2—Minimum Coal to Start Fire

Fire bowl dia.	lbs. of coal	Cost @ $10.00 per T
20 and 22"	50 to 75	25 to 38c
24 and 26"	70 to 100	35 to 50c
28 and 30"	100 to 150	50 to 75c

Example 3—The house in Example 1 (page 24, February issue) has been shown to require 10c worth of 80c 530 B.t.u. gas to heat it 10 degrees for one evening. What will be the coal cost @ $8.00 per ton, assuming a furnace with 24" fire bowl?

Answer—28 to 40c not counting the wood or labor of firing, fussing and disposing of ashes. A saving in this instance of 18 to 30c, plus the convenience. This means that upon every cool evening requiring heat for comfort this amount would be saved. Inspection of weather Chart 2 shows about 50 days in a season when 5-15 degrees of gas heating can show such a saving.

In many cases more coal would be added so that the fire could last over night, whereas with gas the fire could be turned out because gas can very quickly bring the room temperature up in the morning and then be turned off until the evening chill again sets in. A gas auxiliary furnace with the co-operation of the owner can effect a well worth while saving upon the approximately 50 days of each season when only part day heating is required.

In the examples which follow, the gas is assumed at 1000 B.t.u.s per cu. ft., costing $1.00 per MCF, and 3500 B.t.u. coal is assumed at $10.00 per 2000 lb. ton. The reason for selecting the above amounts is because the costs can be readily transposed to suit other heat values and prices for coal and gas. In the following examples a 2 story 24 x 3 house of average construction is assumed which, according to formula 1 requires 1512 B.t.u.s gas input for each 1 degree hour of heating. The cost of the 1000 B.t.u. $1.00 gas is 10,000 B.t.u.s per 1c, which according to formula 3 give us a cost of 0.1512c per degree hour of gas auxiliary heating.

Example 4—What are the coal costs per hour of continuous heating for 5, 10, 15, 25 and 30 degrees of heating compared with gas costs as above, for the above house?

As the least coal combustion per sq. ft. of grate per hour which will safely remain ignited is about 1¾ lbs. corresponding to about 10 degrees of heating, the 10 degree rate is the least which can be assumed for the coal, when only 5 degrees of heating is actually required. That is, with coal there will have to be some over heating to maintain the fire, whereas with gas no more heat than actually desired need be turned on.

To get the "comparative" B.t.u.s per 1c (to compare with the gas cost figures) we proceed as per formula 7, which gives us the figures in the second column below. Proceeding as per formula 8 we get the "comparative" coal costs per degree of heating, listed in the third column. Multiplying this by the degrees of heating shown opposite in the first column we get the cost of heating with coal, shown in the fourth column below, to the number of degrees specified in the first column.

The fifth column gives the gas costs to which the coal costs may be compared. The costs given are for each hour of heating. The relative gas and coal costs may be readily transposed to suit other than $10.00 per ton coal costs and other than 1000 B.t.u. $1.00 gas.

Table 3—Comparative Coal and Gas Costs

	Coal @ $10.00 per T.	1000 B.t.u. Gas at $1.00 per MCF		
Degrees of Heating	Coal Cost B.t.u.'s/1c	Coal Cost per degree hr.	Coal Cost per hour	Gas Cost per hour
5	8100	.187c	0.94c	.76c
10	8100	.187c	1.87c	1.51c
15	10800	.140c	2.1 c	2.27c
20	12700	.120c	2.4 c	3.02c
25	14600	.104c	2.6 c	3.78c
30	15400	.100c	2.94c	4.54c

It will be noted that for the fuel costs and heat values given the gas costs for heating are less than for the coal up to 15 degrees of heating. At 20 degrees of heating, gas costs about .6c per hour more for the cleanliness and convenience and at 25 degrees of heating the gas cost is 1.18c per hour more than for coal. These figures are of course approximate.

By transposing the figures to suit the coal costs prevailing in your own locality, and the gas costs to conform to your local costs per therm or B.t.u.s per 1c, you can get an idea of what the opportunities are for your own company.

Human factors come into play as an important influence upon the final gas operating costs. Some owners take advantage of the fact that with a gas auxiliary the room temperature can be very quickly raised, whereas with coal this may be a question of hours. They can therefore turn the gas out or down very low at night. They can maintain a gas fire for short periods, which is impossible with a coal fire. Also, because coal fires will not remain lit on less than a certain heat volume delivery, it is not worth while to turn off the heat to unused rooms in mild weather, but with gas this economy can be effected. For instance, take the case of 20 degrees of heating in Table 1, the gas cost of 3c per hour can easily be brought down below the coal cost. The point to be emphasized is that opportunities for economy exist during the milder weather which are not possible with a coal furnace. Some home owners take full advantage of these economies, others take advantage of the possibilities in the other direction, namely to have more even heat and comfort than they ever had with coal. The

former type may have gas bills below the calculated cost, the latter type will have larger than calculated gas costs. Where economy is exercised by the owner the effort required is only an extremely small fraction of the care required by a coal fire.

Another point to be noted is that the savings effected by a gas auxiliary during part day heating periods and during weather when the degrees of heating required are low enough to show a saving over coal costs, may be applied to pay for somewhat higher gas costs during still cooler weather. The owner can therefore break even in colder weather than indicated by Table 3. Further, the economies mentioned in the preceding paragraph can carry him into still cooler weather at no increased annual fuel cost. Again it should be emphasized that the gas bills are entirely within the control of the owner.

Example 5—How does 800 B.t.u. mixed gas at 65c per MCF compare with good Pocahontas coal at $8.00 per ton at 5 to 25 degrees of heating?

Answer—Formula 5 gives the B.t.u.s per 1c delivered into the rooms as 8200.

Formula 6 gives the coal costs in B.t.u.s per 1c delivered into the rooms as follows:

5 degrees—7125; 10 degrees—7125; 15 degrees—9250; 20 degrees—11000; 25 degrees—12375. These coal cost figures, remember, are for continuous heating and in comparing with gas cost figures are subject to the modifications mentioned a few paragraphs back. It is probable that all required heating can be done down to 25 degrees of heating at very little increase in cost over coal, assuming due economy to be exercised.

It will be apparent, if the costs are studied as thoroughly as the importance of auxiliary gas heating justifies in view of the great need existing for new sales channels for gas house heating, that auxiliary gas central heating has a market which is distinct from that of either conversion burner installations or gas designed furnaces and greater than both of these. Because auxiliary furnaces are employed in weather when coal furnaces are at their worst, gas auxiliary heating will tend to create favorable impressions for gas heating. No gas heating sales set-up is complete without central gas auxiliary heating occupying its place in the sales campaign program.

Notes on High Pressure Gas Distribution

DISTRIBUTION ENGINEER *outlines operation and installation of House Governors*

(Continued from February issue)

Location of Vent

THE end of a vent must be kept open, which appears to be a simple task but is actually one difficult of perfect attainment. The most obvious location from the viewpoint of consumer, safety engineer, local politicians and others not vitally concerned with the maintenance of a gas system is above the roof. While this should carry any escaping gas to a point which should give a maximum of protection, it does not do so, as winds do not blow horizontally but actually blow downward at times, and during periods of no wind and fog gas will settle to a surprising degree.

When a governor blows, some obvious indication should result so that the utility is notified, otherwise the amount of unaccounted for gas would be prohibitive. Numerous methods indicating governors blowing have been tried without success where the end of the vent is in such an inaccessible position, as above a roof. The indication is some form of noise making device, usually a whistle. The velocity of gas in a vent from a weeping or slightly blowing governor, which occurs more frequently than violent blowing, is not sufficient to produce a sound attracting attention. The whistle is subject to corrosion, affected by vines growing on a house, bugs attaching nests or ice and snow. In noisy surroundings the slight additional noise of a whistle would not cause sufficient attraction.

Fig. 6—Vent Located Above Roof.

An odor is less irritating to nerves but more offensive than noises and, therefore, more likely to result in a complaint. An example of this is a consumer who tolerates a squeaky meter, but immediately reports the least odor of gas near the same meter. Safety education has been carried to the point where but few would allow an odor of gas to exist without reporting and should they refrain from reporting, would be open to a charge of negligence on their part should any damage occur. For these reasons the running of vents above roofs is an infrequent policy, although installation near the ground requires more intense employee education to acquaint installers with desirable locations.

The most common cause of pluggage with the open end of the vent near the ground is from tampering by both old and young people. Plumbers have been known to put a plug in the end of a vent or cut in a shut off on the vent line; consumers, police and firemen have forced plugs in the end and rags or other materials have been wired over the opening. To minimize closing the end of the vent two types

of fittings have been developed: one is a plain elbow having a solid strip across the opening dividing it into two hemispherical halves, and the other a special elbow with squared end having the opening divided into several smaller rectangular openings. Both of these fittings aim to make the plugging of the open end difficul and also to attract attention by having various phrases on them such as "keep open," "danger," and "call gas company." They prevent children from filling the vent with large stones or other foreign matter but do not eliminate the infrequent partial or total stoppage caused by nesting wasps, spiders or insects

All of these fittings should have an opening area equivalent to that of the vent pipe. The one other method which has been tried is that of putting a screen in the end of the fitting or included in a fitting made for that purpose. This method has been the least successful of all, as foreign matter readily accumulates on the screen and a screen is particularly favored by the insects mentioned for attaching their nests, all of which result in partial or complete pluggages. Nothing has been designed to prevent lighting the end of a vent which does occasionally cause damage and can only be prevented by continuous education of the public.

Usual Method of Ending Vent

The most common method of ending the vent is by means of a street ell or elbow installed so that its open end faces the ground. While this method allows easy pluggage, the important fact is that the opening faces downward which prevents rain or snow falling directly into the vent and, aside from being the potential source of trouble already mentioned, rain or snow accumulating on top of the mercury adds to the blowing pressure, and if sufficient, will cause the mercury to back into the governor in certain designs.

In selecting the location of the open end of the vent, surrounding conditions such as vines, vegetation and trees which might grow into the vent should be avoided; also places where drifting snow could cover the end sufficiently to interfere with vent operation. In newly erected buildings where grading has not been completed the ingenuity of the installer is sometimes taxed. A vent should never be installed until it is absolutely certain that the building has been completed at the particular location selected so as to avoid any additional construction which might surround or enclose the vent.

Location of End of Vent—Safety of person and property should be the primary consideration in selecting a location for the atmospheric end of the vent. For safety to persons, a location should be selected which will not allow escaping gas to enter a building in harmful quantities. Safety to property requires that consideration be given to the effect of escaping gas on nearby shrubbery and the possibility of gas becoming ignited.

The type of building construction is an important factor in location, as the vent outlet must avoid proximity to any openings, similar to the space sometimes found between the sill and sidewalls, to prevent entrance of escaping gas to the open sections between outer and inner walls where it would accumulate and seep into the interior. The gradual accumulation during the governor blow may result in an explosive mixture.

Equipment installed in a building sometimes requires open end ducts or vents carried to the exterior, such as cold air inlet ducts to warm air furnaces, coal chutes and sanitary system vents. It is sometimes difficult to see these ducts or vents where they are concealed by shrubbery or are underneath porches surrounded by lattice work.

The part of a building adjacent to a large open area is usually the best location for the end, as the wind has more chance of maintaining good circulation, diluting and carrying away the gas as fast as it escapes. Alleys, small court yards, air shafts and the inferior angles of L's or bays provide air currents which often carry the gas to undesirable locations, or no circulation which results in high gas concentrations, and should be avoided. If the outlet is on the side the prevailing winds first strike, there is a better possibility of dilution and carrying away than on the lee side. The front of a business building is usually more suitable than the rear for the end, as it is in an open area and any odor will be noticed. This location adds a hazard to pedestrians if precautions are not taken to keep the outlet as near the building as possible and preferably bringing it through the siding of the building a foot or eighteen inches above the ground level to avoid accidents.

Standard specifications are often written providing a minimum distance between end of vent and any window or door. Regardless of how this distance is specified, fulfillment is often impossible. Experience has indicated that the factors already mentioned are sometimes of more importance than the windows and doors, as the majority of accidents occur when all windows and doors are closed. The reason for this is that dilution readily occurs with doors or windows open, thereby preventing anything more than a headache or slight nauseating feeling to consumers. The gas entering a building with windows closed may accumulate to a concentration that is harmful to persons exposed to it for long periods.

Desirable To Avoid Groups of Shrubbery

Gas escaping from a vent can damage nearby shrubbery, the amount depending on the type of shrubbery. It would be impractical to educate the ordinary installer to recognize the more sensitive shrubbery, therefore, the instructions must be to avoid groups of shrubbery close to a building.

The fire hazard is caused not only from application of a flame but from the vent being located where an automobile exhaust might come in proximity to the vent, also the exhaust of stationary engines, burning cinders from railroad engines or industrial stacks, cigarettes carelessly handled or thrown, etc. While no one location can be selected which will avoid all contingencies the more they are kept in mind the less likelihood there is of a utility having damage claims.

It is not always possible to find a location on a building which is suitable and in these cases it is necessary to carry the vent for some distance beyond it. As an illustration, the only place to bring the vent out of a small cellar in a particular residence was alongside a poorly fitted cellar window and immediately under a kitchen window, where it was left on the initial installation. After several governor blows each of which resulted in a doctor attending at least one member of the family, the vent was extended along the concrete floor of an open porch to a place approximately fifteen feet from the building. In another case it was necessary to bury the vent line for fifteen feet and then carry it up a pole to a position high enough to clear any possible snow drifts. These conditions illustrate the maximum distance vents are ordinarily run from the actual building which are necessitated by particular conditions, each having its own individual characteristics which must be considered at the time of installation.

The minimum distance the end fitting should be from

a building was mentioned where the vent is brought to a location that is a possible source of accident to a pedestrian. Wherever possible, the minimum spacing between the end fitting and the building should allow a wrench being placed on the pipe when screwing on the end connection, which would require not less than one and one-half inches. By placing a wrench on the pipe the end connection can be made tight without disturbing joints already installed inside the building. The advantages of a tightly made up end fitting is the prevention of tampering by unscrewing without a wrench. The manufacturers of certain types of end fittings advise having the fitting against the building for appearances only. Other advantages of a slight amount of clearance are minimizing staining the house paint by gas, directing the gas slightly away from the sides of the building, prevention of sealing the vent if the building is shingled or stuccoed or similarly changed after initial construction and ease of installation.

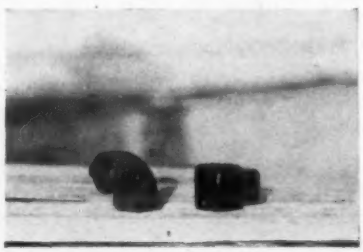


Fig. 7—Special Vent Ends

In addition to mechanical means for keeping the ends of vents open, continuous efforts must be made to educate the consumer against any tampering. There are two schools of thought as to what constitutes proper education; one believes that in no case should consumers be given the attitude that a potential danger exists in the product sold and the other seeks to reveal the function of each device so that a utility will be notified of improper operation.

House regulators are installed on systems where the pressure on the service varies from a few inches water column to five pounds without venting. Years of experience justify the elimination of a vent on these systems. What the maximum pressure should be is determined by the highest pressure which can be safely carried on meter and house lines. Three pounds pressure is the more common standard. The limit of three pounds should not be exceeded on natural gas distribution where the gas has no odor. Between the three and five pound limits the use of cast iron case meters would be an added safeguard.

Above five pounds maximum inlet pressure vents and seals are recommended in all cases. Examination of premises served by unvented governors and inlet pressures above five pounds has indicated a large amount of leakage on house lines, especially on the range rail cocks, and has caused too high burner flames on all types of appliances, inefficient burning and the giving off of carbon monoxide so that consumers admitted frequent headaches. The type of governor used on such installations is mostly the toggle joint type. Even governors with high leverage can not be depended upon indefinitely to maintain low outlet pressures, as their power results in the orifice cutting deeply into the disc causing its failure and the throwing of full pressure on the house lines. An argument used in favor of no vents is that consumers will report high flames on burners when they would not notice a slight blow, however, this conflicts with the idea that the odor of gas or an odorant has more effect than seeing a high flame. Variable flames on appliance burners is poor service. It is not the outlet pressure when the governor is first installed that is the basis of service, but its average during its life. Governors without vents have more variable outlet pressures, since they have not a fixed limit to their maximum pressure as provided by a seal.

High Pressure Renders Diaphragm Porous

Although a diaphragm may not fail from tearing, the leather used in practically all house governors for this purpose becomes porous when pressures exceed one-half pound, which is frequent on non-vented governors. Any leakage through the diaphragm will be carried through the breather hole and into the building. This is recognized in a few utilities using no seals, but a vent is run to the exterior of the building to carry off gas resulting from porosity or tearing of the diaphragm.

The cost of a seal cast integral with a governor adds approximately 8% to the cost of a governor, being about twenty-five cents per governor which is a small factor in the total cost of a governor and worthwhile because of its insurance value. Experience has not borne out the theory that the installation of a vent signifies a potential danger to the consumer, as few give the vent any consideration, and those who do, assume the attitude that it is a necessary part of equipment. Consumers previously residing in low pressure districts will occasionally ask the significance of a vent and, especially after the governor has blown, will advocate low pressure but these have not been a source of trouble to utilities. On the contrary, where no seals are used the question is often asked why can not the gas be governed, since the idea of automatic controls has been made common knowledge through advertisements of all types of modern household appliances.

Fig. 8—Well Located Vent Near Ground. Arrow Indicates Vent

It is impractical to impart to consumers complete knowledge of the operations of equipment installed for their service. The continuous efforts to induce consumers to read their own meters has resulted in but a small minority realizing its value and still fewer actually reading their meters. The same is true of house governors but this is no reason for the discontinuance of every effort to induce the public to report any odor of gas immediately. The direction that the efforts of a utility will take for this education depends on local conditions. Favorable places for the presentation of a general knowledge are schools, boy and girl scouts, civic organizations, police, firemen and the consumers themselves at the time of installation. The presentation of such information as reporting an odor of gas is not always direct but is included in talks on safety work, resuscitation, facts about the industry and numerous other subjects in which the particular individuals may be interested.

The proper time to advise a consumer of the purpose

for a vent is during installation, emphasizing particularly that the end must be kept open and that any noise in the governor or odor of gas from the vent should be reported. The training of employees is important, as their impressions will be carried to the consumer and should there be conveyed the idea of fear of the product handled or lack of confidence in its mechanical controls, their attitude will leave an unfavorable impression on the consumer. The employees should be impressed with the perfection of the house governor and that the reason it does not function properly is not always due to the governor itself, but mainly foreign matter carried to it by the gas and that this foreign matter is kept at a minimum by efforts put forth in the construction, operation and maintenance of equipment previous to the governor. The employees' education should be in as complete detail as circumstances will permit, so that he thoroughly understands all factors on which proper functioning of the governor depends to the end that his answers to questions by consumers are intelligent. Employees must be cautioned, however, in the nature and extent of the information to be voluntarily imparted and the restrictions in their answers to queseions.

The rules of a number of utilities state that the answers to any questions must come from certain officers and parties to whom the consumer is referred. Experience demonstrates that few employees will follow this to the letter and a natural desire not to appear ignorant is not only inherent in man but valuable if properly directed. There is a considerable difference in this respect between practice in high and low pressure fields. High pressure work deals with more apparatus, requires more education of the employee and leads to more questions from consumers. If the answers to these questions are not given by the employee at the time of installation the consumer is seldom interested to the extent of inquiring at an office. This necessitates direct contact between installer and consumer which in most of the low pressure sections is considered the function of a new business or commercial department. The advantage of the installer explaining is that he can do so after completing the work and the parts to be dealt with are visible to the consumer.

Information Should Be Brief But Clear

The information imparted to the consumer voluntarily should be as brief as clearness will permit, stating that the governor is for the purpose of changing the pressure carried in the mains to one easily and economically used on their appliances and has been accepted only after numerous tests and meets rigid qualifications. However, nothing is perfect and should the governor fail to function properly there will sometimes result an odor of gas in the vent line which has been installed for the purpose of carrying this gas to the exterior of the building. It is important to call their attention to the necessity of keeping this vent on the exterior and should they ever alter the building in any respect there will be no charge for carrying the vent to a new location.

The idea of saying definitely that there will be no charge is one looked upon unfavorably by some new business and commercial departments, as they feel that the customer will expect other changes to be made without charge. It has been found that consumers to whom this fact has not been made clear will enclose vents, attempt to change them or employ some mechanic to do so who will not be familiar with what constitutes a good location. The consumer should also be shown that the end of the vent is open to the atmosphere and should remain so under all conditions. The additional equipment and pressures carried on high pressure distribution adds responsibilities to a utility among which an important one is keeping a vent end on the exterior of a building. For these reasons the objections to the consumer understanding that no charge will be made are not warranted and, in addition, should any accident occur it can be proven that every practical precaution had been exercised to safeguard the consumer.

Use of Direction Tags

As a supplement to the educational work, each vent should have at least one tag attached to it near the governor location calling attention to keeping the vent open and reporting odors of gas. The wording of this tag brings forth the idea of whether danger should be called to the consumer's attention. The use of the word danger in large letters is one of the best methods of attracting attention to a card and arousing the necessary curiosity to promote reading of the details. Some feel that the tag is of sufficient importance to warrant placing on the outside of the building as well as in the interior. The exterior tag must be stamped metal or preferably the wording can be cast into the fitting used on the end. If the vent is long, tags should be placed at critical points such as one in each room the vent traverses.

Instructions to employees may be definite within the covers of a book but it is impossible to remember every detail while on a consumer's premises, therefore, attention must be continuously called to the most important points. A method that has proved highly successful on vents is having the phrase, "condition of vent" printed on every type of work order issued, with a space to note whether it is satisfactory or it was repaired. This has had the effect of disclosing unsafe conditions of vents, when otherwise the employee would have had no occasion to inspect the location of the governor and trace out the vent. The time consumed for this inspection is so insignificant that it is charged to the specific work for which an employee entered a building. As an added precaution, the employee should be required when working on or immediately adjacent to a governor to take apart the union on the vent line and blow through to determine whether the vent is clear. This practice should be standard when a meter is installed or turned on.

Should Customer Turn Off Gas When Governor Blows?

A question often raised is whether a consumer should be instructed to turn off the gas service when a governor blows. Where brass or iron-body brass-core cocks are used inside the cellar, a consumer should be warned against attempting to turn them on and off, for, as already mentioned, they are easily broken. There is little danger of breakage from operation by a consumer where sturdier shut-offs, such as plug cocks or regular valves, are installed. However, it is found that a consumer will misuse the privilege of turning gas on and off for any purpose and when turning it on frequently cause the governor to blow by too sudden manipulation. There have been frequent occasions where a governor blew and the consumer turned the gas off when not using an appliance and on again when desired without reporting to the utility. In one actual case a resulting explosion from this practice more than offset any saving in that territory from having consumers shut off the gas.

The subject of vents has been considerably detailed as they constitute the greatest source of trouble if not kept open or if improperly installed and located. Their

importance would suggest the advisability of a periodic inspection which is uncommon in actual practice, one thought being that no matter how frequent the calls are made, tampering with or surrounding a vent with additions to a building would result in a low safety factor. With the very rapid increase in high pressure distribution systems, a periodic inspection or some practical substitute may have to be used, otherwise public opinion will become active in such a manner as has occurred in certain localities where automatic gas shut offs are required outside of a building, actuated by a fire within the building. Such devices are costly but of little practical value. In the majority of high pressure districts the consumers have had only high pressure gas and have become familiar with troubles which might develop and report promptly. The trend is toward the conversion of many low pressure systems to medium or high pressure or actual replacement with a high pressure system. In these areas there is an initial tendency for consumers to report all sorts of difficulties, aftributing them to the governor, and thereby resulting in a high number of complaints which gradually decrease as fear of the equipment is overcome.

Matter of Governor Inspection

The cost of periodic governor inspections would be high, as in suburban areas it has been found that the maximum an inspector can average is forty governors per nine hour day, not including inaccessible buildings where a return call must be made, lowering the average to between thirty and thirty-five per nine hour day. This inspection should include a pressure test on the low pressue side, disconnecting the vent to determine that it is clear and noting down such factors as oil seeping through flanges or door plates, condition of vent, any noticeable odor of gas in cellar, condition of service cock, and service especially where it enters the wall, any odor in vent at outlet, suggestion as to relocation of vent especially the open end and any suggestions or complaints which the consumer may give; all of which facts are noted on a standard form. The inspector should make no repairs, a follow-up crew immediately doing such work as clearing or extending a vent to a safe position and leaving less urgent work such as caring for oil drippage, cementing around the vent pipe where it goes through a wall, replacing corroded sections, etc., for slack periods. To be valuable an inspection of this nature should be made at least annually, since conditions may change considerably in that period, especially during the summer when many occupy their time during vacations in work around their own premises.

A less costly method would be to number all governors by placing badges on them and create a set of records similar to those for meters. Previously the stamping of "condition of vent" on all orders was mentioned. The report where governors are numbered should include the number and the nature of the inspection made which would be recorded on the individual historical record. These cards could be inspected at least once a year and all locations which had not been visited in the regular course of business could be tabulated and inspected.

It has often been suggested that the meter reader should be expected to report governors blowing or their improper functioning. A meter reader has a single duty to perform which in itself is of the utmost importance and additional duties cause a distraction and loss of time undesirable wherever the size of the territory necessitates the full time of one or more meter readers. A meter reader is seldom under the jurisdiction of the department installing and maintaining governors which results in a divided authority, usually unsuccessful. A meter reader would look upon the governor inspection as a secondary task and seldom possesses sufficient knowledge to make the necessary observation in the available time. Where the size of a territory does not warrant the full time employment of an inspector the work can best be done by the employees who ordinarily install and maintain the governors, as they will be familiar enough with detail to quickly recognize needed maintenance. This type of work should be checked by a supervisor to guard against inefficiency or lack of interest resulting from the monotony of repetition.

The primary purpose of the inspection is to ascertain the condition of a vent, but the changing of the valve disc on every governor is added by a few as part of the duty. An inspector changing a disc does not look for the cause of improper valve functioning with the idea of remedying the cause, due to lack of time and facilities. The preferable policy is to use the inspector for the recording of definite facts, leaving maintenance to those who ordinarily perform that duty.

(Continued in April issue)

Gas Company Operations for 1931 and 1932

For California, Arizona, Nevada, Oregon and Washington and the Province of British Columbia

	1931	1932	Percent Change
Production—Mcf			
Water Gas	3,044,755	2,907,490	
Coal Gas	1,508,872	1,516,614	
Oil Gas	8,018,683	7,017,779	
Coke Oven Gas	640,584	670,870	
Butane Gas—550 Btu	157,274	252,531	
Natural Gas Purchased	163,156,872	135,086,528	
Total	176,527,040	147,451,812	—16.5%
Active Meters—Dec. 31			
Domestic	1,569,318	1,533,513	—2.3%
Commercial and Industrial	68,552	69,897	+2.0%
Total	1,637,870	1,603,410	—2.1%
Sales—Mcf			
Domestic	58,693,423	62,834,836	+7.0%
Commercial and Industrial	90,027,134	61,818,596	—31.4%
Total	148,720,557	124,653,432	—16.1%
Gross Revenue			
Domestic	57,522,916	60,066,317	+4.4%
Commercial and Industrial	18,910,557	14,893,419	—21.2%
Total	76,433,473	74,959,736	1.9%
Miles of Main—Dec. 31	25,335	26,512	
Number of Employes—Dec. 31	11,544	11,432	

Pacific Coast Gas Association

Operating Trends in New England

A symposium on distribution practice and metering methods

HORACE G. TAYLOR

Manager, Lawrence Gas and Electric Company

IT is a foregone conclusion that the day of Bell and Spigot cast iron pipe with lead and cement joints is on the wane. All manufacturers of cast iron pipe either have developed or are developing mechanical joints. Joints of this type depend upon gaskets to seal the joint, and 95 per cent of the gaskets manufactured are compounded rubber. Joints have been so constructed that the rubber gasket is kept under compression when installed and the rubber will not flow when attacked by gas oils. There are about a dozen types of mechanical joints on the market; some, for plain-end pipes, and others an adaptation of the Bell and Spigot joint. All depend upon bolted rings to force the gasket into the joint. New England companies are fast changing over to mechanical-joint installations for cast iron pipe.

Welded steel pipe is being used more and more for extensions, both for transmission and distribution lines. Most of the New England companies are tending toward higher pressures, particularly for suburban extensions. Steel pipe lends itself to this work because of the ease of installation and because with smaller pipes and higher pressures, the investment costs are much lower. Therefore, territories have been served where costs would have prohibited low-pressure, cast-iron installations. Mechanical joints and the coupling type are also used on steel pipe, particularly on the larger sizes.

Most of the welding has been done by the oxy-acetylene method but the electric welding method has been growing in favor throughout the country for the past five or six years when the amount of welding warranted the investment in complete generator equipment. Today there seems little choice as to which method is the better. It is merely a matter for each engineer to decide as to investment costs, etc.

Use of Clamps

In order to reenforce cement and lead joints and to assure their being tight under much higher pressures on the lines, clamps have been installed by many New England companies. There are six outstanding clamp manufacturers. Each type has its own particular merit and all have been improved during the past two years, mostly at the insistence of gas engineers.

In general, the clamps are of the two-ring type; one ring for the back of a bell and the other for the front. Bolts are used between these two rings to draw a split-rubber gasket tight against the face of a joint which gasket is thick enough to cover the joint and part of the face of the bell.

Clamps have been limited in use for twenty-eight years but it is only within the past six years that their use has become extensive. All of the larger gas companies in the United States are using clamps to reenforce repaired joints. A majority of the New England companies are using clamps to some extent.

Both cast iron and steel fittings are now being manufactured with plain ends and mechanical bell joints. Most companies are insisting that all fittings must be tested and for that reason, factories and mills are turning out much better products than formerly. The general rule of the companies seems to be that cast-iron fittings must be tight on the air test of twenty-five to fifty pounds and steel fittings under one hundred pound pressures.

Many of the New England companies in order to improve customer servicing have established schools for servicemen. Men are taught the servicing of all types of appliances. In some companies, the schools are continuous. As new appliances or controls are brought out, the men are thoroughly schooled in the construction, operations, and servicing. In this way, the work is kept up to date.

School work is very essential, particularly as new automatic controls are constantly appearing on the market. Appliance manufacturers have been very helpful and teach gas men thoroughly how to repair and service their products.

Instruction to Plumbers Helpful

A few companies have included the teaching of outside plumbers and fitters in their schools. This has been particularly helpful to the companies as plumbers have become enthusiastic boosters for the gas companies. One company has put seventy-two plumbers through its school this past year.

Formerly, it was the policy of the gas companies, especially the larger ones, to have specialized men or groups of men to do the different types of servicing, but now the tendency is to acquaint men with all serv-

Portion of a paper, "Operating High Spots for 1932," read before Seventh Annual Business Conference, New England Gas Assn., Boston, Mass., Feb. 16-17, 1933.

icing. With men thus trained, the efficiency of the service department is raised; much duplicating of work is eliminated; work is accomplished much quicker; and better public relations are established because the consumer has more confidence in the gas companies.

Because of the lack of main and service laying this past year, distribution engineers have had a chance to develop efficient ways and means of accomplishing this work. Some innovations have been introduced.

A combination truck and compressor unit has been adopted by one large company which has proved a great success. This unit is in use twenty-four hours a day. During the ordinary eight working hours, it is used on general service installation and is used for emergency leak work for the other sixteen hours. The compressor is air cooled; it is driven by a power take-off from the engine shaft; and it has a capacity of one hundred sixty cubic feet of air a minute. The truck is a one and one-half ton size and is equipped with boxes which hold tools for all types of general and special work. This combination is especially adaptable for suburban work and it is predicted that the use of units of this type will become more and more universal.

Several manufacturers have developed machines to insert valves in lines without shutting off the gas. These machines have proved a great boon to the gas men for both low and high pressure work on steel and cast iron pipes. The gas men are relieved of much anxiety and the installation costs are greatly reduced.

Another machine which has come into general use is one to tap a main of any size without shutting off the gas. A split tee is used on which is installed a valve. The machine is bolted to the valve and the tap is made through the open valve. After the tap is made, the cutters and the cut piece of main are drawn back into a bonnet on the machine and the valve is then closed. This is all done without any leakage of gas. Some engineers have used a hat flange welded to the main for steel installations. There is no comparison between the safety, efficiency, and economy of this modern method and the old method of installing a tee by a cut-out either by a shut-down or through the bag and stopper method.

Gas engineers are fast becoming safety-minded and are giving much time and attention to teaching employees along these lines. Many companies have adopted well organized plans with safety supervisors and committees in every department of the company whose functions are to teach safety, review every accident, place blame, and in general to conduct the safety work within the department.

Safety has become a great factor in the gas business and the reduction in accidents has been great. Safety work pays mighty good dividends as has been proven by those who have a systematic plan and have eternally hammered on the idea of safety at all times.

Business Situation Retards Extensions

Financial conditions during 1932 were not conducive to the planning of many large extensions to our distribution systems. During 1932, the work was largely confined to the filling in of small gaps and small extensions for a limited number of additional houses. These were generally reached by laying low-pressure, cast-iron mains.

Many previously planned extensions had been proposed and started several years ago and were therefore completed last year. For this reason, it is well to make a resume of what might be considered the accepted method in design and installation. Generally speaking, most companies have favored high pressure systems when considering the new projects and usually steel pipe with acetylene welded joints was selected.

Due to the favorable soil conditions from a corrosive standpoint, a relatively small percentage of this steel pipe was coated or wrapped to protect it against corrosion. Most companies, however, put on a protective covering when the main is exposed under bridges, through streams or in wet marshy places where soil corrosion might be excessive.

These steel mains are generally laid with expansion joints, installed at intervals of approximately 1500 feet apart, also at railroad and river crossings, bridges, etc. Another almost general practice, although not universal, has been to install expansion joints at either one or both sides of cocks and drips.

The type of line shut-off most generally selected has been the lubricated plug cock type with square head extension operated directly by a wrench for the smaller sizes and a geared cock to be operated by a square-end wrench on the larger sizes. Practically all of these cocks, especially the larger sizes, are installed in manholes but the regular valve boxes were used almost entirely on sizes up to and including 4 inches.

Use of Gaskets With Flanged Connections

Where flanged connections are used next to valves, drips, etc., the accepted form of gasket seems to be the corrugated steel type. Many other kinds of gasket material have been tried such as sheet lead and various makes of fabric packing but the corrugated steel gasket seems to be meeting with most favor.

The practice recently developed tends to follow the idea of installing drips where good low-pressure practice dictates their location and the old idea of eliminating drips entirely on high pressure systems seems to be reversed.

Troubles develop due to water conditions on high pressure systems, though to a lesser extent. The drip is usually of the line-pot type installed right in the main. Recent practice would indicate that drips are being used more generally than they were a few years ago for high pressure systems. Most of these drips are of welded-steel construction and in many cases are fabricated by the local companies.

The service connections to these mains are usually welded to the top of the main. In a high percentage of cases, the service from the main to the property line or curb cock location is welded, and screwed fittings are used from the curb cock through the cellar wall. The accepted type of shut-off for the service is the lubricated plug cock, although some high pressure gas valves and regular shut-off cocks are used. The approved type of shut-off used at the head of the service in the cellar is the lubricated lockwing cock.

Governor Practice

Many makes of house governors are used but recent developments seem to be bringing most of these types into closer uniformity. Generally speaking, they are of a mercury or oil seal, vented type. The use of vent lines has become accepted practice. Both spring-tension and weighted-type governors are receiving favorable comment, with each class having its supporters.

The anticipated load on many of the extensions made during the past year or two has not been obtained because the consumers were obtained after their income was seriously reduced. For this reason, the pressures

carried on many suburban lines are actually lower than planned with ample capacity to take care of the existing load.

The foregoing facts also tended to postpone the installation of extra compressing equipment. Many different types of compressors are used with various kinds of motive power. The steam-driven unit seems to hold first place where the compressing is done at the plant where steam is usually available and there is a use for the exhaust steam. At outlying points, most compressing is done by electric power with a few gas engine driven units in use at both central or outlying locations.

The change in our compressing problems with the lower pressures has also reduced the necessity of as much enriching after compression as formerly. Due to these facts, very few new methods of enriching high-pressure gas have been developed during the past year.

Diaphragm Leather Investigations

One company has built a new meter shop with modern equipment to test and repair all meters in an efficient manner. The company now puts new diaphragms in all meters that have been out more than five years. They are making a study of semi-chrome diaphragms. Owing to dry gas, all feed mains have been oil fogged and meters have been dipped. This company is using prepayment meters to collect back gas bills.

Another company has over 4,000 meters with semi-chome leather. Their study of semi-chrome leather over a two-year period will lead to discontinuance of the dipping of meters. They are placing meter oil in the inlet column of the meter to prevent corrosion in the columns. A cylindrical wire gauze is also placed in the inlet column to prevent rust from going any further into the meter. Noisy meters, several hundred of which were house heating meters, have not been changed for two years. Being "A" type meters, they were easily oil flushed through the long channel, enclosure and valves. This was done on the premises. This company also has over 2,000 meters with Bakelite valve covers—a valuable help to prevent noisy meters.

Another company reports that the effect of the change from saturated gas to a dry gas upon diaphragms, in non-dipping meters in service 12 years or more, has resulted in shrunk, bleached and cracked leathers, producing slow and fast meters to a per cent much above the average. In Connecticut a new law has gone into effect which stipulates that a correct meter shall be one which proves on a check test not more than one percent slow or fast as against 2% slow and 1% fast in the old law.

Another company reports a new rotating machine for re-oiling diaphragms which has been very satisfactory. They get better oiling of the meters by this machine. A pair of rotary meters is used on one large industrial installation. In other large installations, they use 250-B meters in a battery, with one more meter installed than is necessary to carry the load. This extra meter allows for removal of a meter at any time for repairs or test without reducing the required meter capacity.

Another company has adopted a new policy in their age-in-service or periodic inspection meter changes. The years in service are different and decrease with the new meter factor, re-diaphragm factor and the oiled meter factor. The longest age in service would be the new meter. This company also makes a distinction in the handling of meters from high and low pressure districts. They plan not to use meters from low pressure areas in high pressure areas, and vice versa.

Another company reports a complete meter record and history kept in a meter shop, which is a very effective system. By a study of these meter records and meter test summary, they are convinced that the time taken to keep them is well spent. They are setting prepayment meters when it becomes necessary to shut off a customer for non-payment of bill for gas passed through a regular meter. This practice keeps the customers on the lines, helping to build up the load and often prevents the installation of an oil burner in the kitchen range. A special arranged meter truck for field setting of electric and gas meters has a meter rack or shelf located on the sidewalk side of the truck for safety to the workmen.

Another company has adopted the use of the 20A meter for small house heating installations in preference to the 30A. They have also used Bakelite valve covers to overcome noisy meters, but found that this type of valve cover had a tendency to warp, causing inaccuracies.

Dipped meters were used exclusively until it was determined that the oil acted as a scrubbing agent and retained impurities which caused the diaphragm to rot at the oil level. This has been discontinued. They have adopted semi-chrome leathers in preference to bark tanning for meter diaphragms.

Another company has standardized on the following sizes: 5-B, 10-B, 30-A, 60-B, and 150-A, eliminating eight sizes. This change reduces the amount of repair parts and meters carried in stock, and reduces the inventory investment. Being a combination company, they have combined the meter work of the gas and electric departments in one central meter department. This has resulted in a more economical operation, greatly improved service, and reduced clerical labor.

Another company has also recently combined the installation of gas and electric meters.

Another company reports a change back to the prepayment meters due to collection troubles. They also set prepayment meters to collect back bills, including appliance and coke bills.

Tests to Determine Rate of Oil Leaving Diaphragm

Another company reports that actual tests are being conducted to determine the time rate at which oil leaves the diaphragms. The tin case positive displacement type "B" meter is used universally on both the low pressure and high pressure distribution system. Within the last five years, a number of "C" type meters have been purchased for demands exceeding 1,000 cubic feet per hour. There are occasional meter installations where a rotary type or large iron case displacement meter is used. One installation of industrial meter equipment was made recently using a 500 "B" positive displacement iron case meter, provided with a pressure volume recorder. High-pressure gas is supplied to two governors to reduce the pressure to six inches water column. The gas is then passed through the iron case meter and delivered to a group of three demand limiting orifices connected in parallel. This particular industrial plant formerly produced its gas requirements in its own gas plant and also provided a small holder for storage purposes. This holder is convenient for the new installation because it allows the industrial plant to accumulate gas during the night hours to supplement the requirements during the work hours and therefore to maintain practically a constant 24-hour demand.

Another company reports a case where it is necessary to apply a pressure correction to gas metered at about

20 inches water column pressure instead of the usual city pressure.

Use of Indicating Demand Meter

Another company has an industrial gas rate which is a demand rate based upon a demand charge of $4 per month per 100 cubic feet of demand per hour, plus 60c per thousand cubic feet of gas used. The hourly demand is based upon four times the maximum 15 minutes demand. They have been using a demand attachment of the indicating type, which is operated by a synchronous motor. They found it necessary to insist that the manufacturer build into the meter a stop attachment, which would prevent the demand hand from registering a full scale reading if a current interruption occurred. They supply gas to a beach district, and in addition to locking the meter, have installed curb cocks on every service. These cocks are closed as soon as service is discontinued at the end of the summer season. This district is made up largely of frame dwellings, and they feel that the addition of the service cocks from a fire protection standpoint alone is well worth while.

Another company reports setting nothing larger than 100-B meters, using as many as necessary in batteries for big consumers. They have never used any rotary displacement or orifice meters for measuring gas sold to industrial consumers but do sell to other Utilities through rotary meters.

Another company reports the installation of 8,300 fire valves for the calendar year, among approximately 45,000 meters in use. They have had no cases yet where the fire valve has been of service. They report noisy meters in general, and have not overcome the trouble. They have been successful in three cases in getting the owners of apartment houses to replace many individual meters with master meters. The advantage in these places, of course, is that the owner gets a lower rate for gas in his restaurant or cafeteria, and has the talking point of free gas to his tenant. This, of course, is absorbed in the rent.

Another company reports that house heating meters in sizes 10-A, 30-A and 60-A are noisy and squeaky at times when operating. They have had Bakelite valves installed in these particular meters and find no further trouble. They formerly set one meter only for entire consumption of house heating and all domestic uses. They have now gone back to setting two meters, one for house heating and one for domestic use. They find this more satisfactory as most of the consumers would report their combined bill to their neighbor as the amount used for house heating, which would make their house heating bill look higher than it really was.

Another company reports considerable pilot trouble due to gum or some particles of solid matter in the gas. This trouble was particularly prevalent on lines carrying pressures up to twenty-five pounds. To correct this trouble, steam was injected into the gas stream after the holder. This had the desired effect in regard to the pilots, but the effect of the steam soon began to show on the diaphragms of the meters. A large percentage of the meters tested registered slow. They have discontinued the use of steam in the gas mains, and meters now being brought in are more nearly in a normal condition.

Another company states their meter study reveals that diaphragms should have 1 inch clearance above the bottom of the meter to allow for condensation not touching the diaphragm. If this were done, many of the present-day leathers bleached at the bottom could be reclaimed with oil. As it is, they are destroyed.

A summary of the opinions as to types of meters for measuring large volumes of high-pressure gas is of interest; that is, rotary displacement meters as compared to electric, orifice and wet drum types.

The relatively larger number of displacement meters in use, both for measuring gas manufactured at the plants and for outlying areas, as compared with the number of meters of the other types, indicates that the rotary type displacement meter has received fair acceptance as a measuring device.

Where gas is measured at high pressure or at points distant from the plant, the so-called wet meter is eliminated entirely on account of the limited pressure at which it can be operated and also the danger of freezing. The necessary attendance to the water-level has practically eliminated the use of this meter except at the points of production.

Therefore, let us summarize the opinions as to the advantages and disadvantages of the rotary meter as compared with the orifice and electric type. There seems to be a very decided opinion that the rotary meter requires less expert attention and less delicate recording mechanism than either of the other two types.

The fact that a change in the specific gravity of the gas does not change the accuracy of the displacement meter is another big factor in its favor. It is admitted that correct recording of the specific gravity of the gas is required in order to uniformly correct the readings of an orifice meter. A change in the analysis of the gas will change the accuracy of the electric meter.

All type meters require practically the same correction for temperature and pressures. These two recording instruments are very satisfactory, relatively simple, and can be calibrated very readily. These are the only two recording mechanisms required to assure the accuracy of the rotary meter.

Importance of Slip on Displacement Meter

The general opinion seems to be that the per cent slip on the displacement meter is not serious if the meters are operating at anything over 8% of their rated capacity. The correction applied from the manufacturer's slippage curve is usually within the range of the desired accuracy, except where extremely small quantities of gas are passed on the large capacity meters and under those conditions the readings of the orifice meter are almost useless.

Most companies report that the op-

erating cost of the electric meter is a serious feature because sufficient heat must be applied to dry the gas that is passing through the meter and the outside power required for both electric and orifice meters is considered objectionable. The distant control features of these two meters, however, is deemed an advantage because it permits the recording mechanism to be installed at any convenient location.

Many displacement meters are used for measuring gas at intermediate pressure where gas is delivered from a transmission line into holders of other utilities where the meter is placed beyond a reducing valve or governor.

The advantages of the orifice meter are ease of installation, ease of checking, compactness and portability. Its disadvantages are primarily that it will not take care of a big variation in flow and requires indicating devices to record the specific gravity. The fouling of the main changes the differential pressure readings across the orifice and seriously affects the accuracy.

The advantages of the electric type meter are: first, it records the amount of gas passed directly; second, it is easily checked; third, it can be controlled at any distance from the meter. Its disadvantages are that it requires outside power to operate, and is not correct with changes in pressure and gas analysis. It is also complicated in design and requires considerable expert attention to check regularly the results.

The advantages of the displacement meter are that it requires little attention, no outside power, and whatever error is inherent in the meter, it is always constant and in favor of the purchasing company. It has also the advantage that variations in specific gravity or analysis of the gas do not change the accuracy or registration of the meter. It has very little complicated mechanism that requires attention. However, the human element is very important in determining the accuracy of correcting the chart readings.

It is agreed by most of the companies that the rotary displacement meter is reliable and more men favor it than either of the other types.

First Gas Well in Jackson, Miss. Field Three Years Old

THE first gas well was brought in in the Jackson, Miss., field just three years ago and it now has 100 producing wells from which more than sixteen billion cubic feet of gas have been withdrawn. The first well was brought in Feb. 16, 1930, by the Jackson Oil & Gas Company's Mayes No. 1, making an estimated 2,000,000 to 6,000,000 cubic feet of gas. A total of 150 wells have been drilled since of which about 50 have been dry holes.

The pull from the field during January of this year, as reported by Dr. George C. Swearingen, state oil and gas supervisor, was 923,976,000 cubic feet. Total withdrawal from the field since its discovery and up to Jan. 1, 1933, was 15,207,000,000 cubic feet.

Jackson started using gas from the local field in October, 1930.

Oregon Rejects Bill

Anti-Merchandising Legislation Defeated

FOR years certain dealers have been threatening to put the Portland, Oregon, Utilities out of the merchandising business.

Finally in February of this year Senate Bill No. 122 was introduced to take away from the Utilities the privilege to sell their appliances.

This Bill was killed by indefinite postponement and a similar Bill introduced in the House of Representatives was withdrawn.

The principal opposition was conducted by the Electric wholesale dealers. but several organizations went on record against the Bill. The three Portland Utilities (two electric and one Gas) did not take any particular stand, because they had gradually retired from very active merchandising, and especially the Portland Gas & Coke Company had discovered a way of closing a great many orders through their own salesmen, for the local furniture dealers, who of course appreciated this and became quite friendly, so much so that the agitators against the merchandising of Public Utilities did not get very much of a hearing among their own fellow-dealers

This friendly feeling on the part of so many dealers in Portland was of course a tremendous help to defeat the opposed legislature. It was rather remarkable that the Bill had so little chance, considering the fact that at the present time there is a great deal of agitation on the part of politicians to harass the Public Utilities in every way possible. It has been the favorite indoor sport now for some time, and probably will continue to run its course until some other victim is discovered when the public becomes tired of Utility baiting.

—Paul Ryan, Chief Statistician, A.G.A.

Gas Utility Revenues in 1932

REVENUES of manufactured and natural gas utilities aggregated $636,189,080 during 1932, as compared with $678,679,710 during the preceding year, a decline of 6 per cent, according to reports from companies representing more than 90 per cent of the utility distribution of manufactured and natural gas.

The manufactured gas companies reported revenues of $370,384,269 for the year, a drop of 5.3 per cent from a year ago, while revenues of the natural gas concerns totaled $265,804,811 or 7.5 per cent less than for the year 1931.

Sales of manufactured gas reported for 1932 totaled 345,860,273,000 cubic feet, a decline of 4.8 per cent, while natural gas sales for the year were 643,400,105,000 cubic feet, a drop of 8.6 per cent.

For comparison with other fuels, the production of bituminous coal during 1932 declined 20 per cent from the preceding year, anthracite coal production dropped 17 per cent, crude petroleum output was down 8 per cent, coke production down 35 per cent, while the production of electric power declined 10 per cent.

These economic adjustments characterizing most of the basic fuel industries were reflected in the production policies of the manufactured gas companies during 1932. The declining trend in the production of water gas continued, output averaging almost 11 per cent under the previous year. While the quantities of coke oven gas produced in plants owned by gas utilities decreased 10 per cent the volume of coke oven gas purchased from sources outside of the industry, such as merchant coke and steel companies declined over 14 per cent.

Sales Floor Displays

STUART BRATESMAN
Manager, Display Dept.
Boston Consolidated Gas Co.

IN our quest for new and unusual ideas for window display material let us not forget the sales floor. Remember, after you have aroused the interest of a passerby to a point where he enters your store, your job is only half done. Salesmen must pick up the thread of the sale and explain the various features and prices of the merchandise to the customer.

There is a general feeling among gas companies that all one has to do to make a sales floor up-to-date is to group certain appliances in attractive arrangements and place a miscellaneous assortment of signs on the stoves. This was true, to a certain extent, about ten years ago. Today, progressive gas companies have realized that their sales floors need something else to hold people's interest after they enter the office, either to inspect new appliances advertised in the windows or to pay a bill. Colorful floor settings are the result. All the posters used on the floors are designed and lettered by the same shop, so that the all-over effect is one of harmony and color.

Floor displays should be designed differently from window advertisements. A window display is a type of advertisement that should arouse interest through glass by its smashing colors and original presentation, while a floor display can stand closer inspection and should be constructed in keeping with the desired effect of the entire floor. Sales floor displays do not rely on big proportions and brilliant colors for interest. People have to pass them when they come into a store. They should be interesting, but not overdone.

On these pages are shown two examples of floor display treatments. One, a wall set on gas radiant fires and the other a model kitchen. The heating display measures ten feet long by eight feet high and can be used against any wall of an office. In this particular case it was backed against the display windows. Notice that it is very simple in its treatment, the large wood cut-out letters and the three words under them telling the story of gas heating at a glance. Sheets of cork covered the bases of this setting and were of decided interest as the rest of the display was painted beaverboard.

The model kitchen was planned and constructed in detail. It is a portable type and can be used anywhere in a system of offices. Some kitchens of this type are permanent. Either kind is effective; the only objection to the permanent kind being that of high cost. Study the one reproduced here, words cannot tell you of its many details.

Why not try these ideas on your own sales floor? They are economical to build and will pay for themselves in a very short time.

Effective Advertising Appeals

Analyzed by The Copywriter

Pennies, Just Pennies

"YES—but what I want to know is, will it save me money?"

A good proportion of sales talks end with that kind of a question nowadays. Economy is the new sure-fire argument. If you can prove that your product will reduce the cost of living for your prospect, the chances of selling him are favorable at least. If you can't the task is twice as difficult as it would be under normal conditions. Intangible economies are not sufficient. Your figures must talk in dollars and cents.

After all, the purchase of almost any gas appliance represents a rather considerable sum. The cost of operation may be even more considerable, continuing as it does from month to month as long as the equipment remains in regular use. Many families who might appreciate the comfort and convenience of gas service, applied in a variety of ways, cannot afford the necessary outlay unless they can be shown some compensating factor or factors that will help the equipment, as the advertising writers say, "to pay for itself." That is where smart advertising comes in. This is the kind of advertising that today is bringing results.

Proper Application of Economy Theme

The type of copy that we have in mind should be very carefully distinguished from the sort of thing that almost every gas company has done at one time or another, namely, spending substantial sums of money (usually charged to the operation of the sales department) simply to show gas users how they might cut down on their consumption of gas. The theory was that this advertising cultivated "good-will" and that it reduced the number of high-bill complaints. What actually happened in most instances was that people became so self-conscious with regard to their gas bill that the very thought of increasing their gas consumption through new uses for gas service was fraught with horror and dismay. No—the right application of the economy theme, as we shall call it, is concerned not so much with appliances already in use, but rather with new equipment to take the place of some out-of-date and possibly more expensive method of running a home. Such advertising is helpful and constructive; it does just as much good in the field of public relations, and, most important of all—*it sells!*

It is always of advantage to capitalize on existing social trends whenever your product lends itself readily to such treatment. For example, the trend today is to do more things at home, simply because it is less expensive to do them that way. The publisher of a popular recipe book told us recently that this type of publication is in greater demand today than ever before in his experience. The reason is that thousands of women who never thought they would have to enter a kitchen except to give instructions to the cook are now forced by economic circumstances to do their own cooking. They are frankly bewildered at the prospect and eagerly grateful to anyone who can instruct them in simple, understandable terms. In the same way, and for the same reason, the home laundry has been reborn. An additional factor here is the necessity for making clothes last longer, as they usually do when laundered under personal auspices at home.

"Make Clothes Last Longer by Laundering at Home," therefore, was the subject of an effective gas company advertisement in which was featured all the various types of gas using equipment that are available for laundry use—washer, ironer, dryer, and even the laundry stove. The automatic water heater, of course, was an important part of the display. We have seen how Lux soap flakes have built up an enormous public acceptance by stressing the fact that fine underthings and silk stockings keep their sheen and shape by being washed regularly in Lux. Even more important to the life of such garments is a constant supply of hot water so that things may be washed quickly and frequently. This is a thought that attracts attention because of its timeliness. Gas companies could use it with excellent effect.

The "Stop Thief!" Idea

House heating by gas might be the last item you would think of including in an economy program. Yet even here there is an important message to be directed at the large group of home-owners who think they are saving money on their fuel consumption by combining house-heating and water-heating in one appliance by means of the notoriously inefficient furnace coil. "Why Heat the Whole House To Get Hot Water for a Bath?" That type of headline is what is known in advertising parlance as a "stopper." "Stop This Thief! He's Robbing Your Fuel Bin" is a striking reference to the furnace coil stripped of its masquerading "economies." It is followed by the pertinent information that "the average furnace coil squanders from 150 to 250 pounds out of every ton of fuel that enters the furnace door." What price economy there? Make it specific—"Don't Waste Coal Heating Water." Even a coil in your furnace eats up 20% of your coal. At 10 cents per shovelful, compare this with the few pennies that it costs to heat gallons of water with gas.

A new twist to an old idea is sometimes all that is necessary. For example, "Cheaper Than Dirt!" There is real punch to that slogan, capable of being developed in dozens of ways. Every home uses plenty of hot water; but it may be heated efficiently or inefficiently.

Therefore, "Get What You Pay For—Hot Water Whenever You Need It!"

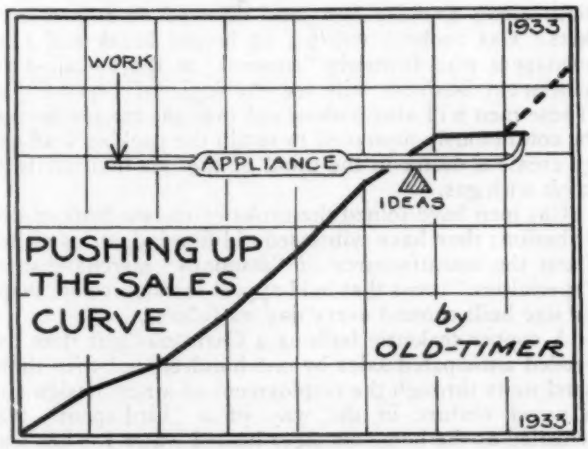
This thought may be applied specifically, or generally as in: "The *More* You Spend for Gas the *Less* You Spend." The best examples of concrete treatment of the economy theme may be found in industrial advertising, of which all too little is being done these days in the gas business. Start with "How Manufacturing Skill is Bringing Down Costs," followed by the question, "Can You Afford To Waste What Gas Users Are Saving?" Show how "Unruly Fuel Runs Up Your Production Cost" and how "Waste's Red Figures Are Turned To Black." Be sure to include an authentic testimonial along the lines of "We Doubled Our Usable Space Which Paid for a Better Fuel in Six Months," or "We Found Where We Were Losing Money." Conclude with the definite suggestion to "Let The Man in the Gas House Cut Your Operating Costs."

Housewife Welcomes Thrift Suggestions

Coming back to the homemaker, she is more than ready to be reminded that "You Can Save on Your Kitchen Budget If You Have the Proper Working Tools." "Why Pay for Heat in Summer," is a headline that reminds her not only of the discomfort of using a non-insulated oven, but of the wasted fuel that consequently follows. "It's Waste Heat That Makes the Kitchen Stuffy" is another and possibly more effective way of saying the same thing. At any rate, it is sound advice that "Obsolete Appliances Waste Gas," especially since utilization tests prove that an insulated oven enables the user to do from 15 to 25% more cooking on the same amount of gas as an old type range. The facts are all such as to back up your statement that "The Modern Automatic Insulated Gas Range Means Better Living for Less Money." The "Thrift of a Good Gas Range" has been explained as "lower gas bills, less kitchen waste, less work for Mother, better and more wholesome foods for the entire family." In short, "Better Food at Lower Cost with Greater Convenience." "How Does She Do It Without a Maid?"

Certainly, "This Is A Year for Counting Pennies" in which "It Is Actually Cheaper To Be Modern With Gas." The best evidence of this, perhaps, is the automatic gas refrigerator. "Living Costs Are Lower"—"Dollars Earn Dollars" when invested in the thrifty gas refrigerator. "Save Money and Keep Garden Foods Fresh" is the basic theme on which innumerable effective changes can be rung. Tell "How Silence Saves Money in Gas Refrigeration." Figure the "Daily Saving in Food Costs." The saving on the ice bill can be strikingly expressed in the statement, "You Are Paying for a Gas Refrigerator, Why Not Own One?"

Economy in management and operation is first page news in 1933. Why not put it into your advertising columns as well?



You Can Save On Your Kitchen Budget If You Have the Proper Working Tools

No manufacturing plant that survives present-day competition dares to skimp or economize on the tools of production. Business men know that labor-saving machines, or tools that speed up the work are not only thrifty, but actually necessary.

In the home, the kitchen is in reality a small-scale manufacturing plant. Its chief business is to provide three appetizing and health-building meals for the family. From the thrift standpoint then, the first investment for the home ought to be modern production tools for the kitchen.

Present-day gas ranges have improved in usefulness even more than they have in appearance. They eliminate guesswork, save losses from poorly cooked foods and make it far easier to get the maximum nourishment from every bit of food prepared for the family. In the interests of wiser management and true economy examine the new ranges at your merchant's store.

Central Hudson Gas & Electric Corporation

Here Is A Timely Appeal

What About New Business?—Some Ideas For Getting It

WHAT about new business? is the question that is being asked by gas men wherever you go. Due to reduced forces and pared promotion appropriations many of the men who are repsonsible for sales seem to be in a quandary. There is no rhyme or reason for this, as we view it. We all know that getting business these days is a tough job. People who have money have it hid, soaked or socked away; there are fewer new homes being created; there are many families who are doubling-up; there are countless brave housewives who have to make present equipment do for the time being and there are fewer dwellings being erected. In other words, the market for home appliances is at a pretty low ebb, *but* what market is not? That is all beside the question. We have to go on and we might as well plan to go on gracefully.

If we will lay out a plan and consistently follow out that plan we will get somewhere and in getting there, although it will be a trying trip, we will have laid a very sound foundation upon which to erect the merchandising structure that we are going to need very much one of these days.

Markets, shelves and purses are all pretty hard put at this moment; there is fear in the hearts of millions, *but* there is no lack of desire and once there is an upturn in employment and an increase in pay rolls, there will begin a spree of spending and a return of confi-

dence. If our house is in order we will be up and going and we will not have to worry about "cooking loads, water heating loads" or the use of gas for fuel.

Keeping Everlastingly At It

As we view it, the way to gain this position is to keep everlastingly at it, working with the tools we have, but employing them to the nth degree. We are of the opinion that we should spread our advertising and sales promotion appropriation over the next nine months in a way that will permit us to be numbered "among those present" on all occasions and in all seasons. In order to accomplish this we think we should dig into our files and bring out and revamp some of the plans that made the riffle in other days, to fit in with a nineteen thirty-three selling season.

There are now many indications that the American people are about to again unloosen their native initiative and, as spring opens, to become more active in many lines. New merchandise will be offered, built along new and more efficient lines; advertising will again be given its rightful place on the program; sales plans, having checked a lot of meaningless chin-music, will be built along sounder lines and directed at known markets. Gas cookery will get an honest break and sales managers who formerly "sneezed" at the so-called replacement business will see the logic of capturing it. These men will also understand that gas ranges have to be continuously promoted to retain the cooking load and to create a desire in the mind of the new housewife to cook with gas.

Gas men have joined the ranks of the students of distribution; they have witnessed old line industries switch from the manufacturer of "standard" merchandise to "specialties," items that held appeal through color, shape or size built around every day usefulness.

A copper teakettle built as a Christmas gift item exceeded anticipated sales by one hundred and fifty thousand units through the employment of a new design and a novel feature in the way of a "bird-spout" that whistled as the home manager heated water for her tea; a gas range manufacturer speeds up sales by the simple device of an actual demonstration of a new burner in the home; the manufacturer of heating units builds business by a fifty-two weeks direct mail campaign to a picked list of factory superintendents, the mailing being a series of government postal cards depicting actual usage of the units. A sales manager by the use of small space advertising is securing greater coverage and absolute continuity, and so on and on.

As we view it, we may, if we are willing to get our ear far enough away from the ground, do a very good constructive job of load building this year. We may not break any records, but if we show an improvement we may well be proud—and we can do that by simply forgetting what our sales curve used to be and get busy trying to make one better than the one we plotted for nineteen thirty-two.

Laying The Plans

It seems to us that we should sit down and coolly map out a year's work modeled upon the same sound lines that we employed in the days when we introduced the cabinet gas range to the nation or when we began to educate folks to the fact that gas was FAST, safe, economical, cool and clean. We undertook this work without a lot of tools, but with an honest belief and a firm resolve to make our properties show a consistent and profitable growth—a growth in keeping with the development of the community and in keeping with the times.

In order to accomplish this we learned the reasons *why* gas was the ideal cooking and heating fuel; we selected a make of appliances that we believed would serve our customers well and efficiently; we advertised in the newspapers; we used bill inserts; finally, we trained "cooks" and held public demonstrations and cooking schools and day in and day out we asked folks to buy.

That sort of effort built the gas industry and the same ideas applied today, together with the improved merchandise and the wonderful assistance offered in the way of helps by the manufacturers, should enable us not only to hold our present domestic load but to more firmly establish it.

In the days when we promoted the cabinet gas range we had very few ideas from outside to help us build our store and window display advertising; even newspaper advertising in mat or electrotype form supplied by the manufacturer was a rarity. About all the help we secured was a flock of folders and filler sheets for our N.C.G.A. hand-book-catalog. But we had conviction and were thoroughly imbued with the realization that if we expected to sell gas ranges and other appliances we would have to do a lot of foot-work along the line of our mains. We realized that we would have to canvass and tell all comers that they should "Cook with Gas" and just why they should.

When we put the cabinet range on the map we had very few extended payment plans and we rarely had a premium for baiting the sale. All that the most of us had was a convincing story to tell and a sound belief that GAS was the very best fuel to be had.

Aside from no premiums for the customer, we had very few contests and scarcely any plans to swell our (salesmen's) own incomes and no extra bonuses. A great many of us worked on the plan that compensated salemen, not for the dollar and cent value of the sale, but on the basis of annual M. cu. ft. of gas consumed by the appliance, nevertheless history records that we made the grade and some of us were very well compensated. (This plan of payment is well worth considering right now.)

Opportunities Better Today

That the man selling gas and gas appliances in 1933 has those of us who pioneered the cabinet range whipped to death, there can be no doubt. Since the advent of the present types of ranges the salesman has been given many new tools to work with and much has been done to educate him in their use. It is for this reason that we say that with any sort of consistent, persistent effort, coupled with localized sales promotion-advertising, any man who is willing to apply the old ideas in a modern garb should have no difficulty in holding his own and laying a foundation upon which to build a most profitable business when home building again gets its stride.

We cannot think of a single appliance that has not been vastly improved during the past two years. Ranges, automatic water heaters, air heaters, house furnaces, conversion burners, refrigerators, to name but a few of them, have all been improved in design and in efficiency. Aside from these improvements, looking at the matter from a purely merchandising standpoint, never before were appliances so attractively priced, at the same time affording us a larger percentage of profit; this, with the added turn-over that we should be able to secure, should enable us to show a profit on our merchandise ledgers.

Turning away for a moment from the improvements in the merchandise, let us take a look at the strides made by the manufacturers' promotion and advertising departments. The helps supplied are truly wonderful.

Think of the vast amount of consumer educational work they have and are doing in the popular weekly and monthly publications and in the daily newspapers. Study the printed helps they supply us for consumer use, study the helps they provide the salesmen—there has never before been anything like it.

Looking at it from another angle, think of the information that is supplied for those interested by the trade magazines. Here you are informed of all new developments, you see reproductions of window, store, newspaper advertising, and successful plans are yours for the reading. This material too is a development of recent origin.

The gas industry offers much to the man who will go out and expose himself to sales and devote a few moments each day to "reading the book." The more he reads the better equipped he will be to earn—at least that is what experience teaches. Know your stuff before you try to sell it, and once you know it and get started to talking about it you are on your way to sales. However, remember that you must keep talking about the things you wish to sell, everlastingly, if you wish to keep your earning curve ascending.

Future Sales Effort of The Gas Industry

An Agenda of Present Problems That Must Be Solved to Restore and Maintain the Load

WALTER C. BECKJORD

Vice-President and General Manager
Boston Consolidated Gas Company

THERE have been so many papers written on the subject of sales policies of the gas industry that it seems a vain hope to inject any new thoughts. About the only thing that I can do is to re-emphasize the fundamental principles which have been so successfully used in other industries and to compare the situation the gas industry now finds itself in with similar situations that have occurred in other industries in the past. We can at least face the issues squarely and tell each other the facts as we see them. Sales problems are not solved by ignoring them. If I can just call attention to the problems ahead and concentrate the thoughts of our group on these problems, some benefit will result.

It is important in any business, as well as in the lives of individuals, to stop and take stock from time to time to see if we are on the right track or not. It is so easy to criticize the other fellow and yet not see the fault in our own picture. Let us get back to the philosophy of hard work and handle the subject without gloves.

We must create in the minds of the public the desire to purchase our product and continue its use.

AS I see our situation at this time, we are just like any other concern that is selling something to the public. We must create in the minds of the public the desire to purchase our product and continue its use. It is necessary in the utility business, before selling a single thing, to construct plants and distribution systems to deliver the commodity to the consumer for his instant use. The consumer is not ready or willing to pay for this preferred class of service unless he can find it to his financial and economic advantage. In other words, we do not have a monopoly.

For many years our industry has enjoyed fairly uniform growth year after year, and perhaps we have grown to believe that we would get our share of business. However, in recent years competition has grown keener and stronger, and we now have to fight not only for new business, but to retain the old. It becomes not entirely a question of earning a fair rate of return on our property, but of maintaining our business.

We should not be stampeded into an effort to meet the competition of distress price on oil.

AT the same time I feel that we should not be stampeded into an effort to meet the competition of distress price on oil, and throw the whole rate structure out of proportion. While increment or promotional rates are essential to get business in the competitive class, they must preserve a relative degree of equity. It must be remembered that the use of crude fuel directly in utilization equipment has its troubles, and in the long run, a considerable portion of this business will come back.

There has been a great deal of progress made in the manufacture and distribution of gas, and while it would be idle to say our problems are all solved, still I feel it is perfectly safe to say that we have put ourselves in a position to handle most any situation, and from now on we must concentrate on selling our product. Every one connected with the industry must be sales-minded, and certainly we were never faced with a more competitive situation than we are faced with today. There has been a broad technical development in the lines of our competitors—oil, electricity and coal—and facilities are now offered, which in some cases approach the results gained by the use of gas. The convenience and flexibility may not be so good in these competitive fuels, but in times of economic stress those features are sometimes overlooked.

The public in general is not interested in the technical story of our development. They are interested in the primary results to be achieved by the use of our product, and naturally, they must count the cost, because the consumer's dollar in these days must cover a broader range than it ever has before. He has so many more ways of spending it. The automobile has come to stay, and that is about the last thing a consumer will give up. Likewise, the radio, the moving picture play, and the additional incidental expense which follows the use of the automobile.

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dence. If our house is in order we will be up and going and we will not have to worry about "cooking loads, water heating loads" or the use of gas for fuel.

Keeping Everlastingly At It

As we view it, the way to gain this position is to keep everlastingly at it, working with the tools we have, but employing them to the nth degree. We are of the opinion that we should spread our advertising and sales promotion appropriation over the next nine months in a way that will permit us to be numbered "among those present" on all occasions and in all seasons. In order to accomplish this we think we should dig into our files and bring out and revamp some of the plans that made the riffle in other days, to fit in with a nineteen thirty-three selling season.

There are now many indications that the American people are about to again unloosen their native initiative and, as spring opens, to become more active in many lines. New merchandise will be offered, built along new and more efficient lines; advertising will again be given its rightful place on the program; sales plans, having checked a lot of meaningless chin-music, will be built along sounder lines and directed at known markets. Gas cookery will get an honest break and sales managers who formerly "sneezed" at the so-called replacement business will see the logic of capturing it. These men will also understand that gas ranges have to be continuously promoted to retain the cooking load and to create a desire in the mind of the new housewife to cook with gas.

Gas men have joined the ranks of the students of distribution; they have witnessed old line industries switch from the manufacturer of "standard" merchandise to "specialties," items that held appeal through color, shape or size built around every day usefulness.

A copper teakettle built as a Christmas gift item exceeded anticipated sales by one hundred and fifty thousand units through the employment of a new design and a novel feature in the way of a "bird-spout" that whistled as the home manager heated water for her tea; a gas range manufacturer speeds up sales by the simple device of an actual demonstration of a new burner in the home; the manufacturer of heating units builds business by a fifty-two weeks direct mail campaign to a picked list of factory superintendents, the mailing being a series of government postal cards depicting actual usage of the units. A sales manager by the use of small space advertising is securing greater coverage and absolute continuity, and so on and on.

As we view it, we may, if we are willing to get our ear far enough away from the ground, do a very good constructive job of load building this year. We may not break any records, but if we show an improvement we may well be proud—and we can do that by simply forgetting what our sales curve used to be and get busy trying to make one better than the one we plotted for nineteen thirty-two.

Laying The Plans

It seems to us that we should sit down and coolly map out a year's work modeled upon the same sound lines that we employed in the days when we introduced the cabinet gas range to the nation or when we began to educate folks to the fact that gas was FAST, safe, economical, cool and clean. We undertook this work without a lot of tools, but with an honest belief and a firm resolve to make our properties show a consistent and profitable growth—a growth in keeping with the development of the community and in keeping with the times.

In order to accomplish this we learned the reasons *why* gas was the ideal cooking and heating fuel; we selected a make of appliances that we believed would serve our customers well and efficiently; we advertised in the newspapers; we used bill inserts; finally, we trained "cooks" and held public demonstrations and cooking schools and day in and day out we asked folks to buy.

That sort of effort built the gas industry and the same ideas applied today, together with the improved merchandise and the wonderful assistance offered in the way of helps by the manufacturers, should enable us not only to hold our present domestic load but to more firmly establish it.

In the days when we promoted the cabinet gas range we had very few ideas from outside to help us build our store and window display advertising; even newspaper advertising in mat or electrotype form supplied by the manufacturer was a rarity. About all the help we secured was a flock of folders and filler sheets for our N.C.G.A. hand-book-catalog. But we had conviction and were thoroughly imbued with the realization that if we expected to sell gas ranges and other appliances we would have to do a lot of foot-work along the line of our mains. We realized that we would have to canvass and tell all comers that they should "Cook with Gas" and just why they should.

When we put the cabinet range on the map we had very few extended payment plans and we rarely had a premium for baiting the sale. All that the most of us had was a convincing story to tell and a sound belief that GAS was the very best fuel to be had.

Aside from no premiums for the customer, we had very few contests and scarcely any plans to swell our (salesmen's) own incomes and no extra bonuses. A great many of us worked on the plan that compensated salemen, not for the dollar and cent value of the sale, but on the basis of annual M. cu. ft. of gas consumed by the appliance, nevertheless history records that we made the grade and some of us were very well compensated. (This plan of payment is well worth considering right now.)

Opportunities Better Today

That the man selling gas and gas appliances in 1933 has those of us who pioneered the cabinet range whipped to death, there can be no doubt. Since the advent of the present types of ranges the salesman has been given many new tools to work with and much has been done to educate him in their use. It is for this reason that we say that with any sort of consistent, persistent effort, coupled with localized sales promotion-advertising, any man who is willing to apply the old ideas in a modern garb should have no difficulty in holding his own and laying a foundation upon which to build a most profitable business when home building again gets its stride.

We cannot think of a single appliance that has not been vastly improved during the past two years. Ranges, automatic water heaters, air heaters, house furnaces, conversion burners, refrigerators, to name but a few of them, have all been improved in design and in efficiency. Aside from these improvements, looking at the matter from a purely merchandising standpoint, never before were appliances so attractively priced, at the same time affording us a larger percentage of profit; this, with the added turn-over that we should be able to secure, should enable us to show a profit on our merchandise ledgers.

Turning away for a moment from the improvements in the merchandise, let us take a look at the strides made by the manufacturers' promotion and advertising departments. The helps supplied are truly wonderful.

Think of the vast amount of consumer educational work they have and are doing in the popular weekly and monthly publications and in the daily newspapers. Study the printed helps they supply us for consumer use, study the helps they provide the salesmen—there has never before been anything like it.

Looking at it from another angle, think of the information that is supplied for those interested by the trade magazines. Here you are informed of all new developments, you see reproductions of window, store, newspaper advertising, and successful plans are yours for the reading. This material too is a development of recent origin.

The gas industry offers much to the man who will go out and expose himself to sales and devote a few moments each day to "reading the book." The more he reads the better equipped he will be to earn—at least that is what experience teaches. Know your stuff before you try to sell it, and once you know it and get started to talking about it you are on your way to sales. However, remember that you must keep talking about the things you wish to sell, everlastingly, if you wish to keep your earning curve ascending.

Future Sales Effort of The Gas Industry

An Agenda of Present Problems That Must Be Solved to Restore and Maintain the Load

WALTER C. BECKJORD

Vice-President and General Manager
Boston Consolidated Gas Company

THERE have been so many papers written on the subject of sales policies of the gas industry that it seems a vain hope to inject any new thoughts. About the only thing that I can do is to re-emphasize the fundamental principles which have been so successfully used in other industries and to compare the situation the gas industry now finds itself in with similar situations that have occurred in other industries in the past. We can at least face the issues squarely and tell each other the facts as we see them. Sales problems are not solved by ignoring them. If I can just call attention to the problems ahead and concentrate the thoughts of our group on these problems, some benefit will result.

It is important in any business, as well as in the lives of individuals, to stop and take stock from time to time to see if we are on the right track or not. It is so easy to criticize the other fellow and yet not see the fault in our own picture. Let us get back to the philosophy of hard work and handle the subject without gloves.

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There has been a great deal of progress made in the manufacture and distribution of gas, and while it would be idle to say our problems are all solved, still I feel it is perfectly safe to say that we have put ourselves in a position to handle most any situation, and from now on we must concentrate on selling our product. Every one connected with the industry must be sales-minded, and certainly we were never faced with a more competitive situation than we are faced with today. There has been a broad technical development in the lines of our competitors—oil, electricity and coal—and facilities are now offered, which in some cases approach the results gained by the use of gas. The convenience and flexibility may not be so good in these competitive fuels, but in times of economic stress those features are sometimes overlooked.

The public in general is not interested in the technical story of our development. They are interested in the primary results to be achieved by the use of our product, and naturally, they must count the cost, because the consumer's dollar in these days must cover a broader range than it ever has before. He has so many more ways of spending it. The automobile has come to stay, and that is about the last thing a consumer will give up. Likewise, the radio, the moving picture play, and the additional incidental expense which follows the use of the automobile.

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We are going to suffer if the gas industry cannot find ways and means of convincing the public it is worthy of their hire.

THIS is the age of advertising and ballyhoo. It is sometimes called the "racketeering age," and perhaps everything can be analyzed down far enough to be called a "racket." But certainly we are going to suffer if the gas industry cannot find ways and means of convincing the public it is worthy of their hire. Statistics show that the oil industry is spending many times the amount of money the gas industry is on advertising and educating the public, and this campaign is bound to have its effect. While it may not be sound judgment to attempt to equal the sums of money they are using for advertising, certainly it is necessary to direct our advertising along intelligent lines to convince the public that we have something they should use.

It is quite evident, however, that before we can sell the public, we must concentrate on selling ourselves on the gas business. I am very much afraid a good many of our people are not basically sold on the utilization of gas. You would not find an automobile salesman traveling around in a Model-T Ford trying to sell a Packard to his customers, by any means. He would have a modern, up-to-date Packard with all the modern gadgets, which help to sell it. I think it is safe to say that about 75% of the cooking equipment on our lines is not modern, up-to-date equipment. How many of our executives and employees are using modern equipment in their own homes? Of course, developments have come along very rapidly in the last few years, but if we are going to keep our customers satisfied, we must make a more strenuous effort than has ever been made in the past to sell modern equipment, with its insulated ovens, thermostatic control and timing devices. Naturally, when they become dissatisfied with old obsolete equipment, they are apt not only to blame the equipment but also the fuel which supplies it. The tendency of the present age is toward electrical equipment on the one hand for a certain class of customers, and on the other hand, toward modern oil equipment which can be operated temporarily at a relatively low cost.

Most people do not analyze their problems thoroughly. It is not enough just to know what the total ultimate cost of the equipment will be, but our constant endeavor must be to show the customer when making comparisons that he must consider all the costs. To be specific, in house heating with gas, the gas bill represents the total cost of heating, which includes servicing of equipment and continuous ample supply of fuel at all times. The tendency of gas rates is downward, whereas with the distress price of oil and the increasing demand for it, it usually results in increased price.

When all costs are considered there will not be more than a 10 to 20% difference between the cost of oil and gas for househeating.

IN the use of oil there are many other factors to be considered,—the separate cost of servicing, higher maintenance and obsolescence charges due to the more rapid wearing out of equipment because it has moving parts, the cost of electric power, the cost of unusual repairs, additional decorating, and the necessity of spending new money for the equipment, which will take several years to pay for out of savings. In average cases, it will be found that when all the costs are considered, there will not be more than a 10% to 20% difference between the cost of oil and the cost of gas, and surely the public can be sold, as they have been along other lines, on the value and importance of the added convenience and comfort of gas. However, it is quite necessary that the industry present a united front on these matters, and if many of those in the industry are content to use oil in their own homes as a fuel, certainly it hurts the effort of the gas salesman to put his story across. The difference in cost of heating houses with gas as compared with other fuels can be expressed in terms of two or three cases of bootleg liquor—it is largely a question of how you want to spend your money.

There is one factor that handicaps a utility in a competitive market, and that is, our standards of service are very much higher than some of our competitors', and we are not given the proper credit for this difference. We would hardly be permitted to carry on our operations in the haphazard and sometimes dangerous way they do. I believe that all of us should, in the public's interest, use every effort to see that building laws, city regulations, etc., which govern in these matters, are obeyed. There have been numerous accidents due to carelessness and improper installation of various types of competitive range burner equipment.

It is true that the gas utility with its large investment in mains and services, which are buried in the ground and cannot be removed, and with its corresponding high fixed charges and tax burden, is not on so flexible a basis as many of its competitors who can cart their product around in a tank wagon at relatively low cost. Naturally, in the come and go of business, some unprofitable investments will be made, and with the use of low-pressure systems in days gone by, the investment cost per consumer is relatively high. However, with the advent of high-pressure systems, this investment cost can, and is being materially reduced, and the investment cost in the future will not be so much of a factor as it has been in the past.

It does not pay to put on a customer one year and lose him the next. It would be better to shade the rate to hold his business.

THERE are two factors to be considered in our present situation. The first is the problem of getting new business, which, of course, is always with us; but the second and far more important one now is holding our present business. All new business added to our lines represents a certain cost to acquire. It might cost as much as $150 to $200 to get a house heating customer on our lines. This is for sales expense, experimental work and possibly the absorption of a portion of the installation charge. It might take several years' operation to reimburse the company for this cost, and then if the customer is lost due to dissatisfaction with the rate structure, or, inability to pay the cost, the whole proposition is a net loss to the company. I think that all gas executives should carefully analyze thier problem to see wherein the balance comes between the cost of putting on additional business or holding present business, and the loss of revenue due to reduction in rate. Certainly it does not pay to put on a customer one year and lose him the next. It would be better to shade the rate somewhat in order to hold his business.

There seems to be a lack of accurate knowledge as to the value of the different markets available to the gas company. The available markets vary, of course, with the location. For instance, in the middle west the large industrial cities have a large volume of manufacturing business, which may consume 30% or more of the total gas sold, whereas, in the larger eastern cities, this would be on the order of from 7% to 15%. That being the case, an executive must analyze his own particular situation to see what manner of customer he has to sell gas to and develop his rate structure accordingly. If house heating is the biggest market available to him, he must develop his rates accordingly, and endeavor to sell as much of that business as he can. There is no point in sitting idly by and saying there is no business available, because the industry must develop a rate structure to get whatever business is available or else get none at all beyond the domestic market. Certainly, a gas company cannot be content with having just the range business and a relatively small portion of water heating business. It is difficult to determine the relative proportions of the various classes of business, but let us say that 10% of the business sold is house heating, 10% commercial, 5% miscellaneous, and 75% domestic. If the average company has a saturation of less than 25% of its customers in modern storage water heaters, there should be a broad market open for this class of work if the rate structure is right. But, of course, in some of the larger eastern cities there are many people who live in apartment and three-decker houses—up to 70% of the population—as is the case in Boston, and these people are not available for water heating business of this type. This means that an intensive effort must be applied to the remaining customers in order that they may be sold on automatic water heating, and this means that efficient, low-priced equipment must be sold in order to broaden the market.

It is out of the question to say there is no new business to get, because there certainly is new business, if the desire to

use our modern gas equipment is created in the minds of our customers, and the rate structure made right to develop this class of business. No general rules can be laid down for this, but each local problem must be analyzed on its own merits.

The consumer makes a substantial investment in gas-consuming equipment in his home—perhaps a utility should make an equal investment on its part.

THERE have been a good many methods in effect for figuring the proper investment to make for each new consumer, and some Commissions have formulated the rule of three times the gross earnings. It must be remembered the consumer makes a substantial investment in gas-consuming equipment in his home, and perhaps it would be well for a utility to make an investment on its part equal to that of the consumer. In other words, if a consumer is going to use gas for house heating and will consume on the order of half a million cubic feet per year, this should most certainly be taken into account by the gas company in making its investment, and by the same token the consumer once having made his investment, every effort should be made to keep him on the lines. The old rule of thumb of 100 ft. of main per customer is obsolete and the more flexible and logical rule of the ratio of gross revenue to investment must be applied.

A great deal of constructive work has been done in the development of promotional or increment rates to sell gas, and this is to some extent accomplishing its purpose in encouraging a broader use of gas in the home. One factor that must not be overlooked in developing rates to get increased domestic business in a given territory, is that the rates on competitive fuels, such as oil and coal, are usually the same throughout the district. It follows, therefore, that all gas sold over and above the average consumption of 3,000 cu. ft. per month, must be sold on the same competitive basis throughout the territory, and while the initial steps in the gas rate may be higher to take care of increased cost of service, the larger blocks should be the same rate as in the city proper. After all, the domestic use of gas is the backlog of the gas industry and this fact must never be overlooked. It is absolutely essential not only to retain the domestic business, but to get more of it, because that is the only business that stays with us during bad times as well as good. It must be remembered that we are only able to make satisfactory domestic rates because we are able to sell other classes of business on a competitive basis. One class helps the other, and if the utility cannot meet competition it must of necessity raise its domestic rates in order to keep solvent. In any given situation the load factor of purely domestic business would be inadequate to give the plant and distribution system a proper load. Commercial and industrial business is essential and the more business of this character that is obtained, the better it will be for the domestic consumer.

There has been some objection in past years to the house heating business, because of its supposedly low load factor, but as a matter of fact, if the load factor is considered over a period of years, it is relatively very good, because it does not have the fluctuation that occurs in industry and commercial business. In fact, in our own case in Boston, the house heating load has held up better than any other load we have, whereas, we are losing at the rate of 8% to 10% in industrial business due to the economic situation, and around 4% to 6% in the domestic. The house heating competitive situation has been materially aided by several rate reductions in the last two years, and there is no question in my mind but that it is absolutely necessary to meet the competitive oil situation by a reduction in rates.

We must remember that this is a rapidly changing world. We have seen very radical changes take place in almost every line of endeavor, including Government, and the gas industry can be no exception in the march of time. It is not sufficient to take the attitude that our commodity is a good commodity, well worthy of the price paid for it, considering continuous ample service. These are essential, but we must also create in the minds of our customers the desire to use this commodity, since other fuels *can* perform the service adequately, if not so well, for the time being.

We have before us the example of the traction business, which has largely gone out of the picture, except where it is subsidized by the cities as elevated service. While this comparison has been used over and over again, it is just as well to stop and consider their situation. They were faced with the rapidly encroaching use of the automobile and the bus, and while some of the companies availed themselves of these added facilities to extend their transportation service, others ignored them, with the net result that there are few traction companies, if any, operating on a profitable basis, and a very large number of companies have gone out of business and pulled up their tracks.

Our situation is something similar, in that fuel is being carried around in trucks and being delivered daily at the back door in containers, where the daily expenditure is relatively small. The disadvantage of the gas industry is that the gas bill comes all at the end of the month and seems to represent a considerable sum of money, when actually the bill is not more than the few cents that are spent daily for newpsapers. However, it is a condition and not a theory we are faced with and there is no use of speculating on abstract philosophy.

Even though manufacturers have reduced the cost of their appliances the consumer expects to get more for his dollars than ever before.

THE question of cost of appliances is one that must be considered, and while it is true that probably none of the appliance manufacturers are making any money at the present time, even though they have greatly reduced the cost of their appliances, it becomes quite evident that the consumer expects to get more for his dollar than ever before, and unless gas utilization equipment can meet the rising tide of competition they are certainly going to suffer in their sales. The mail order houses have eliminated a large portion of the overhead and sales expense in their pricing of gas equipment and some of their gas ranges are of good quality.

It would be rather idle for me to discuss the present economic situation of the appliance industry, because undoubtedly most of you have your own theories on that. One of the basic principles on which this country is built is free and open competition, and it seems that some industries have hurt themselves more than they have helped by this principle. There are undoubtedly too many appliance manufacturers, and the weaker companies are helping to drag down the stronger ones. Time is a great healer for this situation, and only the fit will survive. The gas industry has the great advantage of selling high-quality standard equipment for much less money than our electric competitors, and this is an advantage that should be used to keep up our courage in meeting the present situation.

One of the difficulties in the present situation is that there is apparently no one appliance company strong enough to carry the burden of research expenditure, which must be constantly made in order to keep abreast of the procession. We are constantly searching for greater efficiency both in manufacture and utilization, and while our modern gas equipment has gone far there are still further possibilities to look forward to. Practical work in the field is helpful, but this is not enough. Laboratory research is absolutely essential. One of the most interesting problems in the development of utilization equipment is the use of high pressure direct on the apparatus with a pressure regulator. This would give absolutely uniform operation and consumption. It would permit houses to be piped with steel tubing and would make for more efficient apparatus. There is considerable development work being done on this very thing at this time in England.

In the water heating field, there has been an outstanding development in the last few years, and the low-demand water heater is coming into its own. A great deal of pioneering work has been done and now most of the larger companies are falling into line. It took them a long time to recognize the basic value of this principle. The old theory of selling the customer the high gas bill seems to have gone by the board, and we are now faced with the necessity of teaching the customer to use as little gas as possible for his needs, because in selling a high-grade fuel, which of necessity carries a burden of fixed charges and distribution cost as well as manufacturing cost, the customer must be taught to use it efficiently and must be sold the equipment which will accomplish this purpose. He cannot afford to waste it, as is done with some of the cheaper crude fuels. Detailed survey of consumers' equipment kept up-to-date is a valuable adjunct to sales effort for water heaters and ranges.

In years gone by successful companies have foregone dividends in order to put money back into the business.

IT is just as essential to invest in the sales end of this business as it is in plant and distribution equipment. That is a vital principle that many executives entirely overlook. You will find, if you study the records of successful companies, that in years gone by they have foregone dividends in order to put money back into the business, and by that I mean to encourage development and sales of proper equipment to the customer in order that he may make further use of gas. This covers the field of domestic cooking, water heating, refrigeration and house heating, not to mention, of course, the broad fields of industrial and commercial application of gas. It is absolutely essential to spend dollars to develop business and to keep on spending for that purpose, intelligently.

This is done in the way of advertising, direct sales effort, and experimental work both in the laboratory and in the field. Those companies which have done most in these lines in days gone by, are standing at the top of the list in earning capacity. Their position is sound because not only do they have excellent customer relations on account of the development work they have done, but their rates are promotional in type, so as to encourage the further use of gas. It seems to me highly unsound to invest $4 per $1 of gross of plant equipment, and then spend nothing to develop the sales end of the business. Unless these policies on the part of some companies are changed, they are going to suffer very materially in years to come, and many of them will lose out altogether.

The railroads have come through a period of declining sales and while this may be largely due to increased use of the automobile for passenger service, and the truck for freight hauling, nevertheless in many instances it is due to lack of proper sales effort on the part of the executive staffs. Take the dining-car service—it does not compare either in quality of food or in price with the high-grade chain restaurants in modern cities, which make every effort to please the public. A case I have in mind is that of the Santa Fe Railroad, which contracted its dining service out with the now famous Harvey System, and they have achieved an international reputation for the quality of their food. Even out in the desert you can get a meal only to be equaled in the famous restaurants of New York. This shows what can be done if the proper energy and principles are applied. Many of the leading railroads might profit by this example and increase the number of satisfied customers.

I think too often we gas men are content to sit around and discuss matters entirely from our own viewpoint. We used to think the public must be led around to our way of thinking. We must remember that when a man is spending money with us he is entitled to consideration, because after all, he has a choice in how he spends his money, whereas, if we have made the investment to serve him we cannot go away and let the situation take care of itself. If we do not get him sold on the proper understanding of our service, we are just simply out of luck and it is our fault and not that of the customer. I am convinced we are not getting our story across properly, and that we must redouble our efforts if we are to succeed in doing so. This factor alone needs a tremendous amount of intelligent effort.

While we are discussing the necessity of the customer understanding our business why shouldn't we know just as much about theirs.

INCIDENTALLY, while we are discussing the necessity of the customer understanding our business, why shouldn't we know just as much about theirs, and that applies to the large industrial consumer as well as the domestic. How can we expect to help them solve their problems if we don't know what they are? I once heard a utility man say, in discussing a certain rate situation, that the bill for utility service in that particular case represented a very small percentage of the total cost of production. He had overlooked entirely the fact that this small percentage represented twice the profit per unit on the entire transaction.

A great deal has been said about every one being sales-minded, but I doubt very much if we have a clear conception of what that means. We are in a business that we have every right to be proud of. It is serving the public well and efficiently and is a leader in the march toward better living conditions. However, unless we can show people how they can use our service to advantage they are going to go elsewhere. I do not mean every one is qualified to go out and ring doorbells and sell ranges, but certainly every one can become conversant with our service, policies and what we have to offer, and in their many daily contacts with friends and neighbors, they will have opportunity to sell the idea of gas service. This means, however, that the employees themselves must be sold on gas service, and must utilize modern gas equipment. I think any company could afford to make a substantial inducement to employees to install in their homes modern gas equipment, in order that they may make a daily demonstration of what can be done. Surely a better investment in sales effort could not be made. The new educational program of the A. G. A. and the National Directing Committee is an exceedingly able and valuable effort and should be strongly supported by the industry.

In the long process of splendid development that has brought the gas business to its present very creditable state, much ground work has been done that may no longer be necessary, and if this is so, it should be eliminated. Merely because it has been done in the past, is no sign that it should be continued. Our competitors don't carry on their operations that way. They do what is necessary to render service, at the lowest possible cost, and get business on that basis. We are in the midst of a highly competitive struggle for the survival of the fittest, and it behooves us first to develop a rate structure to get and hold the business, and second, to operate at a profit within the limits of that rate structure. It can be done and it must be done if our business is going to continue to grow and prosper.

The policies of a utility are often misunderstood by the people because they do not have a full knowledge of the facts, and this is where all the employees can help, each in his own way, by telling the facts. I do not mean by this that there should be any propaganda to educate people to wrong ideas, because certainly we have nothing to conceal and the plain facts are our best allies. I am afraid too many gas companies have taken the complacent attitude that the public has to come to them to get the commodity which is most essential. This may have been true in days gone by, but certainly it is not true now, and while we have many superior advantages, if these are not properly understood the customer is going to cheaper fuels on which he may think he is saving money. It is easy enough to talk about what is wrong with our business and point out the sins of omission and commission of the past, but it is quite another matter to formulate broad principles on which the industry can make progress against conditions which now exist. It is true we must leave no stone unturned in the effort to sell gas, and this includes not only sincere and adequate dealer co-operation, with a thorough understanding of his problems and an intelligent effort made to assist him, but also co-ordinated regional advertising, because what affects a small company in a given district is bound to affect the larger company in that same district. In any plan of co-ordinated regional advertising the sales effort must be co-ordinated also.

Dealer cooperation is an intelligent, logical way of developing further sales effort.

DEALER co-operation has been discussed so many times that it seems unnecessary to dwell upon it at great length here. It is recognized as a most essential and valuable sales ally. In fact, many companies have gone so far as to turn over to the dealer all their appliance business, contenting themselves with promotional and educational sales effort. Certainly dealer co-operation is an intelligent, logical way of developing further sales effort, and through a medium that is already developed and functioning.

No discussion of methods of telling the public about our business would be complete without substantial consideration of the home service work. This is fully as important as primary sales effort, for certainly the customer must be taught modern scientific methods of cookery, and unless the woman of the household understands how to get the best out of her gas equipment, we are not going to hold her business. Some companies have greatly curtailed and sometimes even cut out entirely their home service work, during these strenuous times. It seems to me this is a mistake. Now is the time to concen-

trate on it more than ever. Our friends and competitors are doing a good job on this activity. It will pay us to do likewise.

It is not sufficient to tell the story once, but many times, and the story must be followed up with a proper appreciation of conditions as they exist among our customers and with a sane effort to meet those conditions in the way of giving proper credit, time payments, possible renting of equipment, and an intelligent consideration of the competitive problem that exists. Promotional rates alone are not sufficient because in many cases they are not properly understood by the public, and it takes a great deal of personal effort to get people to understand them.

I am more and more impressed with the fact that while we have been telling our story for many years, our customers do not fully understand it. To us, who are actively engaged in the business, the explanation may appear simple enough, but if it does not explain to the public, it has not accomplished its purpose, and I think we must all concentrate on better ways of telling our story and getting the message across. It must be boiled down, in any case, to a dollars and cents relation, so that the actual costs may be understood. I sometimes feel if we could calibrate our burners so that the people would know how many cubic feet they use and translate that into cost per hour, it would be very helpful. I think people have been better educated along the line of understanding the consumption of electricity than they have of gas, and certainly, it should be just as possible in our case to teach them how to do it.

There is one little matter that happens at least twelve times a year in our customer relations, which it seems to me might be improved upon, and that is the gas bill. Surely some better method may be found of not only telling the customer how much he owes us at the end of the month, but in addition, to tell him how much more we can do for him. There must be some way of making a necessary and essential monthly contact with the customer, which would work out more to our mutual satisfaction than it does now. I recommend this problem for careful study.

Any one who thinks the utility business is ever going to be free from problems is treasuring a delusion. We are always going to have our problems and never will be 100% correct. I think if we are right 55% of the time, in this rapidly changing panorama, we will be lucky, but that does not prevent us from making a strenuous effort to achieve a greater percentage of being right and a greater efficiency in handling our problems. It does not pay to brag too much and it does not pay to knock the other fellow. We are all trying to make a go of it in this busy world and I think it is more essential to get our own house in order than to go out finding fault with the other fellow.

The gas appliances we have to offer are modern to the last degree, highly efficient and equipped with the latest automatic devices.

WE have many inherent advantages. Our record for continuity of service is unbeaten. The efficiency of our conversion from crude fuels into a finished product is high. The possibilities of increased capacity of our mains due to increased pressure are great, and the expense of distributing heat in the form of gas is much lower than electricity, and when all factors are considered, it compares very favorably with oil, with the added advantages of simplicity, convenience and safety. The gas appliances we have to offer are modern to the last degree, highly efficient, and equipped with the latest automatic devices.

I feel very strongly that we have plenty of capable men in our industry and if their efforts were concentrated on sales of gas, that more good would be accomplished than in any other line of endeavor. There is no chance of the field becoming saturated with talent, because the variety and the scope of the problems are so great, and the number of contacts to be made are so many, it would make a lifetime job for all of us. No problem is too small to discuss with a customer. He must be convinced in his own mind, because a problem ignored is never solved, and I am inclined to think that in the past a good many problems have been ignored, to our great disadvantage.

I am firmly convinced that if we spend as much time, energy and money on sales effort in the future, as we have on the technical development and investment in plant and equipment in the past, that we cannot fail to make substantial progress. We have the shining example of the automobile industry before us. They certainly have the courage of their convictions, and confidence in their ability to put their industry across. They have done a remarkable job of advertising over the past twenty-five years and have so sold themselves to the public that there is no question but that the automobile has come to stay. We can well profit by their example, and also possibly by their mistakes, but the gas industry is not going to prosper as it should and as it has every right to expect, unless it will concentrate on sales effort from the top to the bottom of the industry.

I have presented a number of papers on different subjects to various groups in the gas industry, and when I come to the end of the paper I often wonder if I have been able to present the problem in a constructive way, which may be helpful to the listeners. The writer of the paper probably gets more benefit himself in analyzing the various factors involved. There is no panacea for our troubles, no mysterious formula that is going to achieve success. It isn't sufficient just to talk over our troubles, we must act as well. It all gets down to just plain hard work, and a clear, careful analysis of the factors, from the other fellow's viewpoint—the man we are trying to sell. He is perhaps puzzled by differences of opinion in our own ranks. Our own people do not always agree. For instance, some of us are not yet convinced on the merits of gas refrigeration and there is still plenty of discussion on ranges, water heaters, conversion burners, and increment or promotional rates.

We must readjust our viewpoint and policies frequently and make sure we are keeping up with the requirements of our customers.

I DO not know of any better way to meet these various problems except to work at them all the time, and discuss them with every one who is qualified to give an opinion on the subject, and one of the most important people to sit at the conference is the customer himself. After all, it is what he or she thinks about that is going to make the success or failure of the proposition. We must remember that conditions which affect people and their methods of living are changing rapidly, and it will not be sufficient to say that we solved that problem yesterday, and that's that. Nothing is ever settled permanently except death, expansion and taxes. We must be able to readjust our viewpoint and our policies frequently and make sure we are keeping up with the requirements of our customers.

I will try to convert the whole proposition to the lowest common denominator:

1st. We, ourselves, must have faith in our own business, and that faith must be expressed in action, not in words. We must have faith in fundamentals and courage to face the facts.

2nd. We must render adequate, efficient service at the lowest possible cost to the customer and keep on reducing the cost as much as possible.

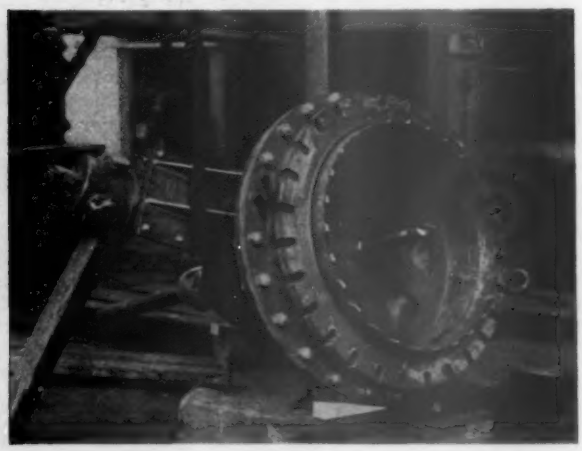
3rd. We must study the customer's needs, and constantly strive to meet his conditions within the limits of his pocketbook.

4th. We must advertise our business and our sales policies in an intelligent, constructive, continuous manner.

5th. We must co-ordinate our efforts with all logical sales allies—dealers, plumbers and the department stores, and we must keep everlastingly at it, not only with the sales force, but the whole organization on the firing line. No effort should be too big or too little to preach the gospel of gas to the general public, to our customers, and to our sales allies.

Tapping A Large Gas Line Without Interrupting Gas Flow

AT the Harrison, N. J., gas plant of the Public Service Electric and Gas Company of New Jersey, it recently became necessary to install a special automatic valve in a by-pass directly connected with the main line from the generators to the big gasholders. Through the same main flows the gas supply of upwards of a million people, since this plant serves practically all of northern New Jersey, there being only a few minor exceptions. Necessarily, the gas supply had to be maintained during every moment of the tapping operations. On many days as much as 40,000,000 cubic feet or even more of gas is manufactured at this one plant. In the case of the first tap called for, what made conditions more unusual and considerably more difficult was the fact that the main was some twenty feet above ground and the cut had to be made vertically, upwards.

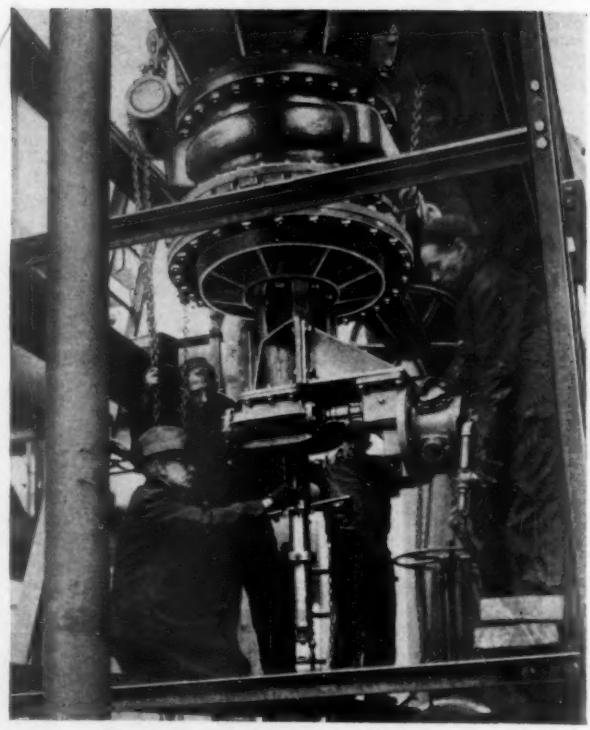


Tapping Machine With Annular Cutter and Concentric Drill

The A. P. Smith Mfg. Co., of East Orange, N. J., was secured to handle the operations, using one of its big tapping machines for making 30" cuts. A steel hat-flange was first welded to the under side of the main, at the exact point where the first cut was to be made. To this a special Smith Tapping Valve was securely and permanently bolted. Then to this valve the Smith Tapping Machine was bolted temporarily.

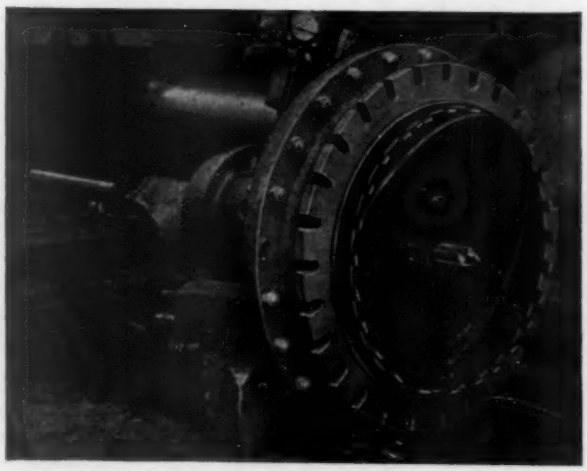
With the gate of this special valve fully opened, the cutting mechanism of the tapping machine was then advanced upwards straight through the valve until it came in contact with the outside of the wall of the main itself which was to be cut.

Preceding the actual wall-cutters in this machine is a drill of relatively small diameter which serves three purposes. It furnishes lubrication for the cutting operation. It furnishes a point of outboard bearing for the tapping machine. And it provides a means of withdrawing the disc after the latter has been cut from the wall of the pipe.



Air Motor Furnishes Power for Making Cut

It then remained but to rotate the cutters under the steady, strong power of an air-motor, for less than an hour, until the complete cut had been made, to lower the cutters and with them the cut-out disc to a point below the gate of the special tapping valve, to close the latter and to remove the tapping machine altogether. On the succeeding day the second tap was made. Later the gas company itself connected the two cuts with a by-pass as had been planned.



The Tap Has Been Made. Note Disc Cut From Pipe Wall

ELEMENTS OF GAS TECHNOLOGY

Laws governing behavior of gas

GAS is one of the three forms of matter, and is that state of matter which is capable of infinite expansion. This state of matter, however, is not necessarily permanent, as under certain conditions of temperature and pressure, gases may become liquid, and these liquids may in turn become solids.

The ancients apparently had very little understanding of the nature of gases, although it is fairly certain that the Chinese, the Egyptians, and later, possibly the Greeks, knew and understood something about different gases and their general behavior, but whatever definite knowledge they possessed is lost in the mists of antiquity. They merely recognized that a gaseous state of matter existed, and it was not until the beginning of the 17th Century that van Helmont coined the word "gas," to describe the substance he found to be produced by burning charcoal. The word was suggested from the Greek "chaos" and is not, as popularly supposed, derived from the Teutonic "geist," meaning a ghost.

Once it was recognized that there were a number of different gaseous substances, many scientists set out to learn something of their nature and properties. In fact, the whole science of modern chemistry may be said to have had its beginnings at about this same time. The names of Boyle, Cavendish, Priestly, Dalton, Charles, Avogadro, Gay-Lussac and Mariotte stand out pre-eminently among the experimenters of the Seventeenth, Eighteenth, and early Nineteenth Centuries, as pioneers who have contributed greatly to the knowledge we now possess of the nature of gases. Indeed, many of the laws governing the behavior of gases are known by the names of some of these men.

Before proceeding to discuss formulas expressing these laws, it is well to establish and explain what is meant by some of the common terms used in connection with them.

ABSOLUTE PRESSURE.—By absolute pressure is meant the *total* pressure per unit of area, acting upon a surface. It is therefore the pressure as indicated by a gage, or gage pressure, plus atmospheric pressure as shown by a barometer at the point of application. The standard value of the pressure due to the atmosphere as adopted by the United States Government is 760 millimeters of mercury at 32 degrees Fahr. This is equivalent to 29.9212 inches of mercury at 32°F. or 14.696 pounds per square inch, at mean sea level. All gas calculations involving pressure are figured on this basis, but are referred to an atmospheric pressure of 14.4 lbs. per square inch, representing an altitude of about 565 ft. above mean sea level at a temperature of 60°F. This altitude is about the average of the principal natural gas fields of the United States.

ABSOLUTE TEMPERATURE.—Absolute temperature is temperature above the absolute zero. Ordinary thermometers are based on two principal scales, the Fahrenheit and the Centigrade, both of which are based on the freezing and boiling points of water. In the Fahrenheit scale, the interval between these two points is divided into 180 equal parts or degrees, with the freezing point at 32° and the boiling point at 212°. In the Centigrade scale, the freezing point is taken at 0° and the boiling point at 100°, having the interval between them divided into 100 equal parts. To transpose readings from one scale to the other, therefore, it is only necessary to remember that each Fahrenheit degree is $\frac{100}{180}$ or $\frac{5}{9}$ of a Centigrade degree, and that there is a constant difference of 32° between the freezing points on the two scales. Thus, degrees F. = 9/5 C. + 32° and degrees C. = 5/9 (F. — 32°). To give an example, what is the Fahrenheit temperature corresponding to 50° C.? By the formula, degrees F. = 9/5 × 50 + 32° = 122° F. *ans.* Similarly, to reduce 77° F. to degrees C., degrees C. = 5/9 (77° — 32°) = 5/9 × 45 = 25° C. *ans.*

It can be demonstrated that most substances contract on cooling and expand on heating at a practically constant rate. This rate is called the coefficient of expansion. For perfect gases, a unit volume at constant pressure decreases 1/273 of its volume for every degree C. drop in temperature, or 1/492 of its volume for every degree F. Therefore, at 273° below zero C., or 492° below 32° F., the volume theoretically becomes zero. The absolute zero temperature, then is —273° C. or —460° F., and in dealing with the expansion or contraction of gases, it is always necessary to use the absolute temperature, which is obtained by adding 273° or 460° to the thermometer reading, depending on which scale is used. Thus, 50° C. = 50 + 273 = 323° C. absolute, and 60° F. = 60° + 460° = 520° F. absolute.

The values of 460° and 273° are not exact, but are sufficiently close for practical calculations. More exact values are 459.64 and 272.85.

SPECIFIC HEAT.—The amount of heat required to raise unit weight of a substance 1° in temperature is called the specific heat of the substance. There are two kinds of specific heat, namely, specific heat at constant *volume,* and specific heat at constant *pressure.* In the latter case, the volume changes, hence work is done, and since work is done at the expense of heat, more heat is required to cause a given temperature rise. Values for specific heat at constant pressure (C_P) are therefore always greater than those for specific heat at constant volume (C_V). In the case of solids and liquids, the volume change is so small that it may be neglected in most calculations, but it is always to be considered with gases.

UNITS OF HEAT.—The standard unit of heat in American and British engineering practice is the British thermal unit or B.t.u. It is defined as 1/180 of the amount of heat required to raise the temperature of one pound of water from 32° F. to 212° F. at sea-level, or as the heat required to raise the temperature of one pound of water from 62° F. to 63° F. In the metric system, the standard unit is the Calorie. It is the amount of heat required to raise the temperature of one kilogram of water from 15° C. to 16° C. One B.t.u. = 0.252 Calorie, and one Calorie = 3.967 B.t.u.

It will be noted that the specific heat of a substance is the *ratio* of the heat required to raise unit weight of a substance one degree in temperature, to the heat required to raise the same amount of pure water one degree.

MECHANICAL EQUIVALENT OF HEAT.—Heat is a form of energy, and since energy dissipated in one form must appear in some other form, there can be no loss in the sum total of all the various forms of energy. The

amount of work done by the heat required to make one B.t.u. is therefore its mechanical equivalent and is equal to approximately 778 ft.-lbs., or a force of one pound acting through 778 feet.

CONSTITUTION OF MATTER.—All matter, whether solid, liquid or gaseous, is made up of a number of exceedingly small particles, called molecules. The molecules are made up of still smaller particles called atoms, and our latest discoveries show that even atoms are divisible into ultimate particles called electrons. All of these particles are considered to be in more or less violent motion, the atoms revolving around a central nucleus, and the molecules moving with respect to each other. All particles of matter, of whatever nature, exert an attraction on all other particles of matter, directly proportional to the mass of each and inversely proportional to the square of the distance between them. This mutual attraction between bodies is called the force of gravitation, and the whole force with which two bodies attract one another is the sum of the attraction of their molecules.

In bodies which are solid at ordinary temperatures, the molecules are closely packed together and are held together by strong attractive forces of cohesion. In substances which are liquid at ordinary temperatures, these cohesive forces are not great enough to enable the mass to be self-sustaining, and the molecules therefore are not so closely packed. In gaseous substances, there is entire lack of cohesion, so that a gas tends to expand indefinitely.

The application of heat to a body increases its molecular motion, which in turn causes expansion. Solids and liquids show this expansion as well as gases, but in very much lower degree so long as they remain in the solid state, but if sufficient heat be applied, the forces holding the molecules are overcome and the body then becomes liquid. If the application of heat is carried still further, it passes to the gaseous state. For every substance there is a critical temperature at which it passes from one state to the other, as well as a critical pressure for the same point of change.

The most familiar substance which exists in all three states of matter within a comparatively short range of temperature is water, which is solid below 32° F., liquid between 32° F. and 212° F., and gaseous above 212° F. In each state of being, it behaves in accordance with the general laws governing that particular state. However, in common with certain metals, such as antimony, it has the property of expanding slightly at the moment of passing from the liquid to the solid state. The reason for this peculiar behavior is not known with any degree of certainty, but it is generally attributed to a rearrangement of the molecules in a new form. When melting ice to liquid water, eleven volumes of ice produce only ten volumes of water at 0° C. The ice water produced, when brought up gradually to higher temperatures, also has the very exceptional property of *contracting* by about one ten-thousandth of its volume, between 0° and 4° C., after which it then expands more and more per degree increase in temperature, until at 100° C. (212° F.), just before passing into steam, the volume is 1.043 times that at 4° C.

LATENT HEAT.—On account of molecular rearrangement when a substance passes from one state to another, certain internal work is done upon the molecules themselves, and conversely. This internal work is known as latent heat, and for each substance there are two points at which this work is done or heat is given up. These are the freezing or melting point and the point of liquefaction or evaporation. The lower one is called the latent heat of fusion and the upper one is the latent heat of evaporation. When a solid substance is heated to the melting point, there is a period just before passing to the liquid state when the temperature does not rise, although heat is being constantly added. The extra heat which must be added is the latent heat of fusion. The same phenomenon takes place when passing from liquid to gas, the extra heat necessary to effect this change of state being the latent heat of evaporation. Naturally, when operating in the reverse direction, heat must be taken away in exactly the same amounts before a change in condition results. Latent heats are of prime importance in gas calculations. They are not constants, but vary with the pressure.

CHEMICAL ELEMENTS CONSTITUTING ALL MATTER.—It has been previously stated that all matter is made up of molecules. These molecules are not imaginary. They are perfectly definite particles consisting of one or more atoms, forming an element or a combination of elements. An element is a definite substance which cannot be reduced to any other substance, and ninety-two such substances make up all known matter in the earth, or so far as we know, in the entire universe. Some elements, such as hydrogen, oxygen, and nitrogen, are gaseous; others, such as iron, copper, and tin, are metals; some like bromine, and mercury, are liquids; the balance are earthy or crystalline. It may be noted that mercury, while a liquid, is also a metal.

In order to facilitate the expression of chemical compounds and to enable us to work out their reactions with each other, each element has been given a symbol, thus making a sort of chemical shorthand. Knowing the number of different elements in a compound and the amount of each, it is easy, therefore, to express both the substance and the amount of its constituents in the same term. Thus water, which is a combination of two gases, hydrogen and oxygen, is chemically known as H_2O. This shows that two atoms of hydrogen unite with one atom of oxygen to form water. Similarly, methane, the principal constituent of natural gas, is expressed chemically by the symbol CH_4, denoting the combination of one atom of carbon with four of hydrogen. The reaction which takes place between elements when uniting to form compounds is most simply shown by an equation, thus: $2H_2 + O_2 = 2H_2O$.

In dealing with equations, we must have a definite standard of values to work with and in the case of chemical elements, these definite values are the atomic weights. We can select one element as a standard and give it a value of unity, or we can select any other element as standard, give it an arbitrary value, and base everything else on that. The first complete modern tables of atomic weights were based on hydrogen as unity, since hydrogen is the lightest element known, and values of all other elements were expressed in their relation to it. However, later researches have shown the necessity for some slight adjustments and the present international standard table of atomic weights is based on oxygen = 16.

The molecular weight of an element or compound is the sum of its atomic weights. Thus, the molecular weight of CH_4, methane or marsh gas, is 12.00 + 4.032 = 16.032. For all practical purposes, the small fraction may be disregarded and the molecular weight of CH_4 is commonly taken as 16.

Third Southwest Natural Gas Sales Conference Supplies Valuable Information

THE beautiful Peacock Terrace of the Baker Hotel, Dallas, Texas, rang with the enthusiasm of over 250 gas men and women from fourteen states, at the Third Annual Southwestern Regional Sales Conference of the A.G.A. on February 24 and 25. The program arranged by a committee under the direction of Mr. C. K. Patton, Chairman of the Conference, J. A. Bell, Vice-Chairman and A. E. Higgins, Secretary, was devoted to the presentation of salient facts of the industry.

Astounding Data

After the opening remarks of the Chairman, the program developed by the National Directing Committee of Executives was explained in detail by Mr. J. V. Strange, Vice-President and General Manager of the United Gas Public Service Co. Mr. Strange as the member of this Committee from the Southwest was well versed in this work and the delegates were greatly interested in his message. In commenting on this plan, Mr. Strange stated that his companies had started on the survey work. The data after two weeks work "were astounding. Of the homes on the lines of my companies, we found 81% were using gas, 5½% were unoccupied, 13% were not using gas and 7% had electric ranges." More astonishing, he declared was the fact that 57% of the appliances in operation needed adjustment. The value of the survey was shown by the action of a group of customers in a town of 50 meters. This group had petitioned for rate reduction, but after the satisfaction following the appliance adjustments made by the survey crew, the petition was voluntarily withdrawn. Mr. Strange explained other steps his organization was taking to put in force the other recommendations of the Committee.

Maintaining Customers and Revenues

Mr. Chester L. May, Vice-President of the Community Natural Gas Company, Dallas, speaking on "Maintaining Present Customers and Revenues" cited the competition being faced in Texas by reason of unregulated fuel prices. With industrial customers being offered lignite coal at $.25 per ton and oil at $.10 per barrel, letters were sent to these customers voluntarily offering revisions of their contracts. The problem of noncompensatory domestic customers was made by a change in rate form. The previous rate of $.67½ per M cubic foot was replaced by one of:

First M cu. ft.	$1.50
Next M cu. ft.	1.25
Next 3 M cu. ft.	.75
Next 20 M cu. ft.	.50
Over 25 M	.45

In spite of the increase for those customers using gas only for cooking and water heating, the results have shown that the sendout has held up well. It is expected that the promotional value of the steps over 3 M cubic foot will materially aid the sale of gas for heating.

Mr. May urged most strongly the necessity for active sales training and experience among all employees.

The Friday afternoon meeting was devoted to specific competition in cooking and water heating.

Water Heater and Range Competition

Mr. C. A. Breitung, Vice-President, Southwest Utilities Co., Ada, Okla., speaking on "Competition in the Selling of Ranges and Water Heaters," stressed the need of active work in offsetting future competition. "Certain high lights," he said, "stand out clearly." These require a careful, continuous appliance survey of every customer's premise and closer cooperation between the Customers' Service Department and the customer to keep this accurate.

He advocated coordinating and developing sales effort by making it possible for "dealers and merchants selling gas appliances to follow cheerfully, confidently and courageously knowing that they will get a square deal."

He asked for "greater flexibility in our present gas ranges and water heaters . . . to go hand in hand with a general program of larger volume and in increasing and more uniform hourly load." Then he concluded that "the name 'kitchen' will remain in the language but we can make it symbolize a comfortable, well appointed, immaculate, well ventilated room which will coordinate in the program of the all gas home."

Mr. T. C. Gooch of the Dallas Times Herald spoke of the remarkable headline touch in many of the advertisements of the Dallas Gas Co. He particularly mentioned the copy in the ads:

"For the Price of a Big Red Apple," which gave the service rendered by gas for a nickel, and

"Dallas 70,000 Smokeless Chimneys"

Apmann on Water Heating

"The Sales Trends from the Water Heater Manufacturers' Viewpoint" was the topic given by Mr. A. M. Apmann of The Cleveland Heater Co. He spoke of the need for more rational agreement among the manufacturers, utilities and dealers merchandising water heaters. The need for keeping the gas company employee informed of the value of the newer appliances by personal use was urged as a means for better understanding of these valuable means of furthering gas service. Statistics showing the trend in the types of water heating appliances disclosed very definite changes over the last five year period. These statistics also gave an insight into the rapidity with which water heaters are withdrawn after receiving Testing Laboratory Approval.

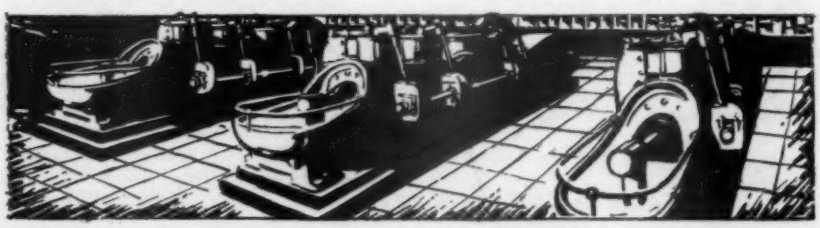
Mr. Thomas Bullion of The Detroit-Michigan Stove Company and Mr. W. E. Derwent of the Geo. D. Roper Corporation divided the subject matter of "The Manufacturers' Range Advertising Program," which was to have been delivered by Mr. J. A. Fry. While their impromptu remarks fell short of Mr. Fry's complete prepared talk, the enthusiasm greeting their remarks indicated the feeling among the listeners of the value of this proposed activity.

A Number of Exhibits

Friday afternoon's meeting was concluded by Mr. Wm. J. Hill of Detroit-Michigan Stove Co., by the presentation of some most recent developments in "Commercial Cooking Competition." The substitutions of gas for oil in the Harmony Cafeteria of Chicago and for electricity in the Union Guardian Building in Detroit were cited as examples of the better understanding of gas service to the hotel and restaurant men.

After the sessions, the delegates visited the exhibits of appliance manufacturers in the Hotel Baker. Among those represented were:

The A-B Stove Co.
The General Gas Light Co.
Detroit-Michigan Stove Co.
The Cleveland Heater Co.
Cribben Sexton Co.
Reynolds Gas Regulator Co.



Ohio Foundry Co.
Standard Gas Equipment Co. (Ironers)
Payne Furnace Co.
Geo. D. Roper Co.
Electrolux
Roberts Gordon Appliance Co.
Vitex

The meeting on Saturday morning was devoted to a symposium: "Better Heating and How to Develop It."

Analysis of Heating Equipment Market

Methods and analyses of the market for the different types of gas heating equipment were given according to the following schedule:

"Conversion Burners," W. Jennings Young, Oklahoma Natural Gas Corporation, Tulsa, Okla.; "Central Heating," A. W. Lordahl, Surface Combustion Corporation; "Sales and Service of Floor Furnaces," Bert P. Fisher, Payne Furnace Company, Fort Worth, Texas; "Sales and Service of Circulating Heaters," Lewis Moore, Jr., The Moore Corporation, Joliet, Illinois; "Sales and Service of Gas Steam Radiators," A. J. Belew, Clow Gasteam Heating Company, Dallas, Texas; "Sales and Service of Space Heaters," Vernon R. Brown, Lone Star Gas Company, Fort Worth, Texas.

Mr. Young's experience based on the results of newspaper space and cold canvassing indicated that selling was difficult, until the saturation of burners became 10% in a community, and then became greatly simplified.

Mr. Lordahl analyzed by states the number of homes and potential gas load from gas heating, with the final summary that in the seven states of the conference a possible load with a 25% saturation existed of 426,000,000 Therms, compared with the domestic load in those states of 394,000,000 Therms. He stressed the need of proper organization and the use of proven sales methods.

Mr. Fisher stated that the average revenue from homes heated with floor furnaces was $60, with the limits between $40 for the smallest homes and $175 for the rambling house heated with a number of furnaces. The value of the floor type recirculating register and the intermediate stage between radiant fires and central heating plants made a profound impression on those in attendance.

Mr. Moore likewise gave data on heating, showing the enormous acceptance of stoves (51% of all heating plants). "The circulating heater," he said "logically can be used to supplant these stoves with the least sales resistance by reason of the type of appliance."

Mr. Belew described in detail the rental plan used for gas steam radiators. The data given showed conclusively that this method gave as permanent a load as the previous outright sale and in addition, made these appliances easier to connect to the lines.

Mr. Brown confining his talk to Radiant Heaters, showed their value in the smaller home. His survey also indicated that they were auxiliary to Central Heating Plants wherever these were installed. He further emphasized the need for close check on the condition and operation of these as well as all other appliances to keep the service to the customer at the highest degree of efficiency.

The final session of the meeting was opened by Mr. C. K. Patton, Dallas Gas Co., who told of the Dallas experiences with gas refrigeration. It was a masterful account of pioneer work in a new field, representing as it did, meeting summer water temperatures of as high as 106°. Perseverance and attention to details, in some cases to sinking coils for pre-cooling the water, succeeded. Mr. Patton referred briefly to the air cooled Electrolux on test in the laboratory of the Dallas Gas Co. and the marvelous possibilities of the appliance. Mr. Roach of the Electrolux gave a brief discussion of the events leading to the development of this latest unit and also of the splendid help of the Dallas Co.

Mr. Charles Burke of Texas Cities Gas Co., pointed out how proper attitudes of installation and service could increase the value of the Sales Department. "The men," he said, "must be clean, courteous and reliable. Clean cloths for laying tools on, and wiping up at the conclusion of a job are the cheapest tools in the bag."

Mr. T. M. Cunningham's paper, "Sales Possibilities of Air Conditioning," described in detail the steam jet equipment in use for commercial buildings and the probability of future exploitation along proper lines.

Mr. Patton in summarizing the conference, urged the men to think seriously of their problems as expressed by the speakers and act promptly and intelligently to foster the interests of gas service.

MID-West Regional Gas Sales Conference

SOMETHING over three hundred gas men were on hand for the Chicago meeting of the Mid-West Regional Gas Sales Conference, Feb. 14-15. In addition to men from gas companies of seventeen states as well as Canada, practically all of the important appliance manufacturers were represented. Of these the following exhibited merchandise in their rooms:

Chambers Mfg. Co.
Standard Gas Equipment Corp.
Crown Stove Works
A-B Stove Company
John Wood Mfg. Co.
American Gas Products Corp.
Sonner Burner Co.
Cribben & Sexton
Electrolux Refrigerator Sales, Inc.
Detroit-Michigan Stove Co.
Fuller-Warren Co.
Minneapolis-Honeywell Regulator Co.

There was no joint dinner with the electric men as planned, since the meeting of the Great Lakes Division of the N. E. L. A. was called off.

Mr. E. J. Boyer, Sales Manager, Minneapolis Gas Light Co., was appointed chairman for 1934.

Some important phases of a number of the papers follow:

Dell Plain's Keynote Address

The keynote address delivered by Mr. Morse DellPlain, furnished some valuable statistics on the consumption of various fuels in the United States during the recent past and brought out that gas consumption has held up comparatively well.

As to gas rates, he had the following to say:

"People are asking, and from their layman's viewpoint it is a justifiable question, 'Because this and that are cheaper, why don't utility rates come down?' It is a most pertinent question. The answer is readily apparent to the experienced utility man but it is equally as bewildering to the customer. We know that our rates never went up in boom times in any measure similar to other commodities. We know that our over all costs have not come down in these days of depression to the extent the layman has in mind. We know that the item of fixed charges, because of the ratio of our investment to volume of business, is by far the largest expense factor in our business. We also know that by the terms of our franchise we must continue to maintain adequate service and extend our facilities, regardless of economic conditions.

"Private business can reduce its overhead or expand it at will according to the current business conditions. But, with us, the public must continue to be served and to do this a constant incoming of new capital into our business is a life and death matter. The cost of this capital to us is dependent on our credit, which in turn is based on our earning capacity. The public policy theory, whereby the public utility business is subjected to strict regulation, clearly recognizes the fact that our rates are not expected to vary from day to day with the vagaries of the law of supply and demand. As a matter of fact, during the boom years, rate reductions were made, from time to time, voluntarily for the most part, but these reductions were possible only on the hypothesis that the revenue lost through the reduction was recoverable within a limited time through additional business

induced by the lowered rate.

"There is ample evidence that in these days, the business is simply not there to compensate us for the rate reductions which the public is demanding. With an average domestic gas bill of $3.00 per month, a 20 per cent reduction in rates would effect a saving to the customer of 60 cents a month or 2 cents daily. With the fuel and light bill already the smallest item on the family budget, the actual effect of a reduction of 20% in the gas bill would seem infinitesimal to the customer, and yet I know that there is not a gas customer represented here this morning that could cut its rates anything like 20 per cent and remain solvent.

"Because of their continued public contact and the potential educational punch contained in the personnel of our sales departments, every member of that department should be thoroughly versed in these elementary economics of our business and be prepared to defend his company's rate policy whenever and wherever he hears the argument raised by the layman."

He spoke on how our best load, cooking, must be maintained, otherwise we will not be able to go after the increment loads on the proper basis and which are highly competitive.

Mr. DellPlain again declared that he does not believe in pushing electric cooking, particularly in combination companies, stating as follows:

"Allow me to repeat here what I have said publicly many times before. 'After a very careful study of this particular angle of our business, I am firmly convinced that very definite policies should be adopted by the management of combination properties looking toward the protection of the base load of each class of service and that the aggressiveness of the sales effort should always be directed toward building up the increment load.' Since I first made that statement I have found no reason to change my views on the subject. In fact, the more I study the situation the more convinced I am of the soundness of that position. In our company, we made a very careful study of the economic effects of electric cooking at various degrees of saturation in a particular combination district which was doing just about as good a job as we had a right to expect, from an earning viewpoint, on both utilities. You have my assurance that it required a very low electric range saturation to play havoc not only with the gas utility, but with the combined earnings of the district, and with no resulting benefit to either the gas or electric consumers. No utility policy can be properly determined without fullest consideration being given to the ultimate effect on the consumer."

He called attention to the fact that we should vigorously combat the political ownership menace at every step and showed that although politicians have made considerably more attacks on the electric utility than they have on gas, even if the electric industry were taken over by politicians, it would not help the gas situation as far as competition being lessened is concerned, since the then politically-run electric companies would furnish intense competition because they would not be bothering whether they made money or not.

Why Salesmen Fail

"Salesmen," said Mr. Lyle C. Harvey, Sales Manager, Bryant Heater and Manufacturing Company, in his paper, "Sales Trend From the Manufacturer's Viewpoint," "lose sales possibly in ten different ways:

"1. Man-power—the lack of enthusiasm—confidence, etc. of the salesman.

"2. Product—A lack of knowledge of just what the product or service will do for the prospect.

"3. Buyer—A lack of understanding of the prospect and his needs.

"4. Questions and objections—not handled properly by the salesman.

"5. Setting for a sale—it may be bad—not appropriate—prospect too busy.

"6. Prices—Salesman not able to overcome it when it comes up.

"7. Profits—Unable to justify prices and to picture profits or benefits to prospect.

"8. Closing a sale—Salesman does not know how or when, or is afraid to ask for order.

"9. Prospects—of poor quality—not a sufficient number.

"10. Training, inspiration and direction—low morale."

Comparative Water Heating Costs

A very lengthy but valuable paper "Selling Automatic Hot Water Service" was presented by Mr. A. M. Apmann, Cleveland Heater Company. From this paper is given below a tabulation of comparative costs of heating water with gas and electricity:

City	Gas Rate	Electric Rate *LRC & WH	Electric Rate LR & WH	Ratio Electric to Gas LRC & WH	Ratio Electric to Gas LR & WH
Illinois					
Lincoln	$1.60	1.29c	1.29c	.75	.75
Pekin (N)	1.00	1.5	1.5	2.6	2.6
Peoria (N)	.90	1.5	1.5	2.9	2.9
Rockford	1.35	1.29	1.29	.88	.88
Indiana					
Auburn	$1.40	2.0c	2.0c	1.35	1.35
Elkhart	.93	1.75	...	1.8	...
Ellwood	1.25	1.75	...	1.3	...
Ft. Wayne	.93	2.0	2.0	2.0	2.0
Gas City	1.25	1.75	...	1.3	...
Hartford City	1.25	1.75	...	1.3	...
Marion	1.25	1.75	...	1.3	...
Mishawaka	1.25	1.75	...	1.3	...
Muncie	1.25	1.75	...	1.3	...
Plymouth	1.75	1.75	...	.92	...
South Bend	1.25	1.75	...	1.3	...
Iowa					
Belle Plaine	$1.90	1.65c	1.65c	.80	.80
Boone	1.70	1.65	1.65	.90	.90
Cedar Rapids	1.35	1.65	1.65	1.10	1.10
Council Bluffs (N)	1.10	1.55	2.1	2.5	3.3
Jefferson (N)	2.80	1.65	1.65	1.05	1.05
Marion	1.46	1.65	1.65	1.05	1.05
Marshalltown	1.50	1.65	1.65	1.00	1.00
Nevada	1.95	1.65	1.65	.78	.78
Perry	1.00	1.65	1.65	1.50	1.50
Michigan					
Ann Arbor	$1.20	1.23c	1.23c	.95	.95
Benton Harbor	1.00	1.75	...	1.6	...
Calumet	1.40	1.96	1.96	1.3	1.3
Dearborn	.79	1.23	1.23	1.4	1.4
Detroit	.79	1.23	1.23	1.4	1.4
Ecorse	.79	1.23	1.23	1.4	1.4
Ferndale	.86	1.23	1.23	1.3	1.3
Hamtramck	.79	1.23	1.23	1.4	1.4
Hancock	1.65	1.96	1.96	1.1	1.1
Highland Park	.79	1.23	1.23	1.4	1.4
Houghton	1.65	1.96	1.96	1.1	1.1
Laurium	1.40	1.96	1.96	1.3	1.3
Lincoln Park	.79	1.23	1.23	1.4	1.4
Monroe	1.50	1.23	1.23	.75	.75
Mt. Clemens	.57	1.23	1.23	2.0	2.0
Port Huron	1.30	1.23	1.23	.87	.87
River Rouge	.79	1.23	1.23	1.4	1.4
St. Joseph	1.00	1.75	...	1.6	...
Ypsilanti	1.10	1.23	1.23	1.03	1.03
Minnesota					
Duluth	$ .57	1.63c	1.8c	2.6	2.9
Faribault	1.20	1.5	1.5	1.15	1.15
Mankato	1.20	1.5	1.5	1.15	1.15
Minneapolis	.78	1.5	1.5	1.75	1.75
St. Cloud	1.35	1.5	1.5	1.02	1.02
St. Paul	.90	1.5	1.5	1.55	1.55
Wisconsin					
Appleton	$1.50	2.3c	2.75c	1.4	1.7
Beaver Dam	1.26	1.5	1.5	1.10	1.19
Beloit	1.26	1.5	1.5	1.10	1.10
Cudahy	1.20	2.0	2.15	1.55	1.65
Fond du Lac	1.26	1.5	1.5	1.10	1.10
Green Bay	.80	1.7	1.7	1.95	1.95
Janesville	1.26	1.5	1.5	1.10	1.10
Milwaukee	.75	2.0	2.15	2.5	2.6
Neenah	1.50	2.0	2.15	1.2	1.3
Oshkosh	.80	1.7	1.7	1.95	1.95
Racine	1.20	2.0	2.15	1.55	1.65
Sheboygan	.80	1.5	1.5	1.7	1.7
Shorewood	.75	2.0	2.15	2.55	2.6
Wausau	.90	1.7	1.7	1.75	1.75
Wauwatosa	1.15	2.0	2.15	1.6	1.7
West Allis	1.00	2.0	2.15	1.85	2.0

* L—Lighting R—Refrigeration C—Cooking WH—Water Heating.

"This tabulation is given on the basis of the latest published A.G.A. and N.E.L.A. bulletins and shows the gas rates for the water heater increment on the basis that 1500 cubic feet of gas are used for cooking and 3600 cubic feet for water heating and on a two-fold basis for electricity for water heating, with and without electric cooking. The rates applicable for water heating in these two cases are invariably different and, of course, the cost comparisons vary accordingly. This data does not attempt to establish actual costs for the service but rather a comparison between the costs of service by the two means for the same customer. The average customer has been taken and variations from this value will be found in practically every company. It would be well following this method for the commercial manager or the water heater specialist to chart out similar comparisons for his own property so that he can tell and recommend to the management the type of promotional work which is necessary, the amount of expenditure which should be made in every territory and the personnel necessary to bring to a successful conclusion, the plans which have been laid down for this work."

Adams on Space Heating

"The Space Heater Market," by Mr. E. C. Adams, Adams Brothers Manufacturing Company, went on to explain the reasons why sale of this type of appliance has declined and at the same time it spoke of the value of the load furnished, particularly to the natural gas branch of the industry.

"As far as this particular division of appliance is concerned," said Mr. Adams, "the industry must soon decide:

"1. How much is the space heater market worth to us in terms of dollars?

"2. Is it of sufficient value to us to cause us to invest money and energy to maintain the existing space heater gas load and to gain this market in new natural gas districts?

"3. What are we going to sell and how are we going to promote sales effort?

"The answer to the question 'What questions in many of the older natural gas districts and in some new natural gas districts where rates are in line with

national averages, are apparent to those who have studied the matter?' The industry in these districts will recognize the importance of this market and will take action to maintain or build space heater sales.

"In new natural gas districts where rates are established from the base of the old manufactured gas price, the question is one that only time can decide. Competitive conditions in cooking, water heating, and central plant heating will determine the necessity or lack of necessity of developing the house heating market to the fullest extent. It may be satisfying to realize that this is an extensive field for gas service available for development if necessity requires it.

"The answer to the question 'What will we sell?' is fairly definitely determined in the minds of manufacturers. The main productive efforts of the future will probably be concentrated upon the development of 'automatic sectional house heating' in its many possible forms.

"Sincere cooperative efforts by the gas industry to develop this field of service will cause a large increase in the development of appliances utilizing the latest scientific knowledge. The most important thing to realize now is that much closer cooperation within our industry is necessary for successful results.

"In closing, may I again suggest the thought that the natural gas industry has much to gain by visualizing space heater manufacturers as a very important part of their sales organization. It is a distinctly competitive fuel activity and a very productive load builder and as such should have the benefit of careful thought and thorough sales effort of both manufacturers and utilities. Never before have the gas industry and the manufacturing industry been faced with the same conditions that exist now. The need for cooperation is very acute. Therefore, constructive sales action on space heaters should be attempted with the least possible delay."

Data on Cooking

The general fuel situation was discussed by Mr. R. M. Conner, Director A.G.A. Testing Laboratory in his paper, "Surmounting Cooking Competition," in which he also showed by figures that many predictions which are made for electricity as a universal heating medium are fallacious.

"I have always felt," said Mr. Conner "that the only really accurate way in which to compare the operating costs of gas and electric ranges would be to take into account the initial costs of the appliances, carrying charges, maintenance charges, efficiencies of utilization, and the relative commodity costs. With information of this nature as a background, it should be quite simple to convincingly demonstrate the economic advantages of gas. Table II, which follows, presents statistics of this nature. Based on average rates and taking into account the above mentioned items, it can readily be shown that the average cost of electricity for cooking purposes is roughly twice that of manufactured gas. Inasmuch as natural gas is generally considerably higher in heating value than manufactured gas and its cost per cubic foot usually less, its ultimate cost to the consumer for similar purposes should not average more than one-third that of electricity. In making such comparison it must, of course, be remembered that total costs and not energy costs are referred to.

TABLE II

Comparative Costs of Gas and Electricity for Domestic Cooking Purposes

Item	Electricity	Gas	Excess of Electricity Over Gas. Per Cent
1. Estimated initial cost of range	$150.00	$100.00	50
2. Estimated annual carrying carge (Assum. 10 yr. life)	15.00	10.00	50
3. Estimated annual cost of maintenance	2.50	1.50	66
4. Average cost of service per unit of measurement	*0.0352	*1.14	..
5. Estimated monthly consumption kw hr. or cu. ft.	85	1200	..
6. Estimated monthly cost of energy	2.99	1.37	118
7. Estimated monthly carrying charge	1.25	0.83	50
8. Estimated monthly maintenance costs	0.21	0.12	66
Total Monthly Cost of Service (Items 6, 7, & 8)	$4.45	$2.32	92

* Average costs of manufactured gas and electric service supplied, respectively by the American Gas Association and the National Electric Light Association.

"Because installation costs of electric ranges vary to a wide extent, such items have not been taken into account in preparing the above statistics; however, they will probably average from two to three times those of gas ranges.

"Our competitors contend that operating cost is not the deciding factor, and on this point I am inclined to agree. I shall now attempt to point out that considerations other than those of an economic nature are quite as favorable to the gas range as the electric, if not actually more so.

"Electric ranges have been represented as possessing the following inherent advantages:

1. More modern in appearance and design
2. Permit maintenance of cooler kitchens due to superior oven insulation.
3. Cause less shrinkage of foods.
4. Create superior food flavors.
5. Possess higher thermal efficiencies.
6. Prevent discoloration of kitchen walls.
7. Prevent depletion of oxygen content of surrounding rooms.
8. Eliminate fire, explosion and asphyxiation hazards."

All of these alleged advantages, Mr. Connor showed, had no foundation in fact except perhaps that there is possibly a slight advantage in favor of electricity as regards Item 5, but this will be completely reversed in the near future due to developments in the gas range, and he indicated that fuel cost is the deciding factor.

As regards the obvious advantages of the gas range over the electric range, he enumerated the following important items:

1. The larger number of makes, designs, and different sizes of gas ranges afford a greater variety from which to select.
2. Gas ranges are considerably less expensive than electric ranges from the standpoint of first cost, installation cost, maintenance cost, carrying charges, and operating costs.
3. The cooking speed of gas range top burners is from 40 to 90 per cent greater than that of electric range top heating elements. Further the time ratio of oven heating varies from 2.6 to 5.4 in favor of gas, depending on the oven temperature finally obtained.
4. Gas ranges are far more flexible in performance. This is a very important factor in saving fuel and one that provides more accurate control of heat.
5. Gas burners are easier to clean than electric heating elements and are not subject to such frequent periodic replacements and repairs.
6. Electric current interruptions occur more frequently than complete discontinuation of gas service. This fact makes the gas range more dependable.
7. The second-hand or trade-in value of gas ranges is relatively higher on account of the ease with which gas equipment may be re-installed and on account of the electrical industry's widely varying installation policies.

American Gas Journal Starts A New Service "*Elements of Gas Technology*"

With this issue the *American Gas Journal* inaugurates a new department. The primary purpose of this new feature is to carry out the idea of Service to the Industry in general and to our subscribers in particular. In this respect, it is not a new *policy*, since Service has always been paramount in our ideas.

We expect to make this Department a sort of clearing house for information of general interest to the Gas Man. It will be based on accurate data secured from reliable sources, and while technical in scope, will endeavor to present the data in such form that it will be understandable not only to the engineer, but to the non-technical man as well. In short, it is our hope that all who are connected in any way with the Industry may find something of value herein, which will help each individual to a better understanding of the problems confronting him in his daily work.

Papers and Addresses at New England Meeting Show Gas Industry Getting Down to Business

H. R. STERRETT,
President-Elect, New England Gas Assn.

APPROXIMATELY 400 gas men were present at the seventh annual business conference of the New England Gas Association held in Boston, February 16 and 17, and much valuable information was derived from the papers and addresses presented since the various subjects treated had to do with the problems which the gas industry faces at the present time.

Major Forward, Managing Director A.G.A., delivered a short address which contained much of interest and after the President's address by Mr. I. T. Haddock, Mr. Arthur Hewitt, President A.G.A., spoke on the subject of "Gas Industry."

In his usual whole-hearted manner, he complimented the work of the New England Gas Association and called attention to some of its prominent past officers in gas affairs in a national way. By means of statistics and figures, he demonstrated conclusively that we are in a comparatively good condition in every respect.

Mr. Hewitt told how the gas industry cooperated with the Government shortly after the start of the present depression by way of the construction work which was done ahead of time at the suggestion of Hoover. After indicating the fierceness of competition from other fuels, he came to the matter of rates in which he said, "When rates are made specifically to get the business, perhaps without regard to the economics of the competing business, it stands to reason that everybody is going to lose and nobody will gain, except for a temporary saving to the customer, who in the long run is likely to suffer from the purchase of equipment which may have no permanence or in the impairment of the service given to him, and the quality of which service is so vitally important to him."

He called attention to the establishment of a National Directing Committee of the A.G.A. and the hopes for good results to come from its studies. In conclusion he complimented New England on its cooperative advertising work and mentioned the fine results obtained by the laboratory in Cleveland.

The paper by Mr. Walter Beckjord which is published in full elsewhere in this issue, was a splendid contribution in that it clearly outlined many of our problems and offered suggestions as to the proper procedure in solving the same.

Sterrett Elected President

The election of officers for 1933-34, resulted as follows:

President: H. R. Sterrett, New Haven, Conn.; Vice-President: F. M. Goodwin, Boston, Mass.; 2nd Vice-President: R. H. Knowlton, Hartford, Conn.; Treasurer: F. D. Cadwallader, Boston, Mass.; Executive Secretary: Clark Belden, Boston, Mass.

Directors: I. T. Haddock, Cambridge, Mass.; Walter M. Africa, Manchester, N. H.; David Daly, Pawtucket, R. I.; R. L. Fletcher, Providence, R. I.; George S. Hawley, Bridgeport, Conn.; John West, Arlington, Mass.; P. R. Buchanan, Chairman Operating Division, Hartford, Conn.; Howard B. Hall, Chairman Sales Division, East Braintree, Mass.; P. A. Nelles, Chairman Industrial Division, Boston, Mass.; Leland Balch, Chairman Accounting Division, Lowell, Mass.; Carl H. Cummings, Chairman Manufacturers' Division, Boston, Mass.

The following awards were presented by J. H. Sumner, Committee Chairman in the Sales Contest:

Class A—20,000 meters or more

		Per Cent
Ranges	Brockton Gas Light Co.	1.86
Automatic Water Heaters	Connecticut Lt. & Power Co.	1.42
Refrigerators	Brockton Gas Light Co.	.48
Domestic Gas Sales	Malden & Melrose Gas Lt. Co.	.64

Class B—5,000 to 20,000 meters

		Per Cent
Ranges	Newport Gas Light Co.	4.14
Automatic Water Heaters	Newport Gas Light Co.	1.90
Refrigerators	Portland Gas Light Co.	.69
Domestic Gas Sales	Arlington Gas Light Co.	.86

Class C—under 5,000 meters

		Per Cent
Ranges	Citizens Gas Light Co.	5.91
Automatic Water Heaters	Lexington Gas Light Co.	2.44
Refrigerators	Woburn Gas Light Co.	.46
Domestic Gas Sales	Lexington Gas Co.	3.74

Highlights of some of the papers are as follows:

Househeating Rates

In summarizing the "Trend of House Heating Rates in New England," Mr. L. H. Knapp, Pawtucket Gas Company said:

"We may say that the following tendencies have been definitely established:

1. Lower priced rates, particularly in the blocks for large consumers.

2. The acceptance of the combined or all-purpose heating rate.

3. The elimination of actual service charges and the substitution of short initial blocks at relatively high prices.

4. A great interest in rates for this class of business and the introduction of several novel features.

"We have been through some difficult years for the gas house heating business. Notwithstanding the difficulty of securing new customers to take the place of the inevitable losses during such business conditions (and the mild weather which has persisted during recent years), the sale of gas for house heating in 1932 was almost identical with that in 1931. For the same period, the amount of gas sold to domestic, industrial and commercial customers in New England dropped off about 6%.

"Lowered rates will be of some assistance in meeting the conditions during this coming year, but it is hardly to be expected that our average reduction of 12% below the 1929 house heating rates, fully equalizes our position in comparison with anthracite coal and domestic fuel oil which have dropped 20 to 30% in price.

"This period of slow sales is a good time for us to take stock of our own methods of supplying heating service. We can perfect our own equipment and do our best to bring our rates and our billing practices into the best competitive position which we can possibly attain. It may be confidently expected, that gas house heating will continue to be sold in increasing amounts and that this portion of the business will con-

tinue to contribute a worthwhile share to the profits of the New England Gas Companies."

Employee Load Building

"The Associated Plan of Employee Load Building," by Mr. Hall M. Henry, Utility Management Corporation made mention of marked success other large corporations have achieved by employee selling and in the case of his own company Mr. Henry brought out that the employee is not asked to sell but rather to assist educating customers on the various services the company has to offer.

He indicated that his company's plan stresses the service to the customer angle as against merely pushing the sale of some trade appliance.

The paper explained the Associated's plan which divides the employees into groups each with a team captain. The team captains are drilled in a specified number of lessons and in turn they discuss these lessons with the members of their groups. The fourteen prepared lessons are as follows:

1. Why do we sell appliances?
2. What is our attitude toward the dealer?
3. Complaints.
   The more common ones being taken up, such as, why aren't rates lower when everything else has come down?
4. Advantages of Modern Ranges.
5. Advantages of Gas Refrigerators.
6. Advantages of Gas Water Heating.
7. Advantages of Gas House Heating.
8. Rates.
9. Competition from Coal and Oil.
10. Domestic Water Heating Competition. A story on this dealing with claims of competitors and the actual facts is being given to employees through team meetings by means of a specially prepared film.
11. Means of creating consumer interest.
12. How to answer customers' objections.
13. The Company's Policies.
14. The Cheapness of Gas, pointing out cost to perform various operations.

Mr. Henry in describing the value of the plan to the employee enumerated the following: increased income, job insurance, increased opportunity for self-expression and self-advancement, means afforded of valuating employee's own job, means afforded of learning more about the company's business, greater opportunity for service to his fellow man.

He stated that the company derived the following advantages: increased earnings, more willing employees, means provided for developing prospects through wider coverage, aid in meeting competition, aid in meeting competition for markets, sales not killed due to ignorance, better public relations. The dealer benefits by way of increased sales possibilities, strengthened for future sales, greater profit, less complaints from appliance sales. Lastly, from the standpoint of the customer she is afforded a means of learning the company's services without feeling she is being urged to buy; second, the customer is given a knowledge of the company's services which she might not otherwise acquire; third, the customer is assured a better service; fourth, new improvements in appliances are more quickly brought to the attention of the customer; fifth, any rate changes which require special use of the company's service are more quickly brought to the customer's attention.

Pointers From a Dealer

An interesting account of a successful dealer utility program was given by Mr. Philip S. Bailey, an old line plumber of North Scituate, Mass. This paper went on to narrate formation of the Old Colony Gas Appliance Dealers Association with the help of the gas company and which was able to largely achieve the following objects:

1. To promote and develop the sale of gas appliances, and the use of gas generally.
2. To provide for the exchange of ideas, and the discussion of problems pertaining to the sale of gas appliances.
3. To provide instruction in the use of gas appliances for members and their employees.
4. To establish a spirit of fraternity among its members.

Mr. Bailey mentioned the great benefit the Association derived from the various gas appliance manufacturers who have addressed them and also called attention to the cooperation given the organization in the way of having each advertiser tie in with the dealer and plumber. Reference was also made to the fact that there was made available to the plumbers and dealers a binder for filing all the latest information on appliances; thereby, keeping the plumbers and dealers informed as to developments in an efficient manner.

In conclusion he spoke of the advantage to gas companies of the plumbers having many friends and being able to get into many homes due to such friendships and thereby being able to talk of gas appliances to them.

Employee Selling

"The New Haven Plan of Employee Selling," by Mr. H. R. Sterrett, outlined the results obtained since its inception in January, 1930. It went on to narrate the scheme of commissions paid and the general scheme of the plan which has been very successful. Results obtained to date are as follows:

Year	Number of Loadbuilders	Appliances Sold	Volume of Sales	Commission
1930 (14 Months) ..	99	301	$33,003	$449.50
1931 (12 Months) ..	91	370	36,004	511.50
1932 (10 Months) ..	76	221	26,755	351.50
Total	266	892	$95,762	$1,312.50

Appliances Sold Through Loadbuilders' Club

Domestic ranges	377
Hot Plates	2
Hotel and Restaurant Units	25
Automatic Water Heaters	237
Circulating Water Heaters	113
Refrigerators	52
House Heaters	29
Gas Steam Radiators and Portable Space Heaters	41
Garage Heaters	1
Easy Washers	8
Ironers	2
Incinerators	2
Industrial Units	3
Total	892

Home Service received considerable attention, there being given on the second day of the meeting a playlet, "A Woman's Point of View," which went on to show the advantages of the gas range over oil and electric cooking. There were three in the cast and Mrs. Lyda Flanders who took the part of the home service worker in a gas company, convincingly combated the arguments of Mrs. Eleanor Kingsley who had the role of an electric range prospect, and Miss Alice Morrison who portrayed the user of a range oil burner.

At the Home Service luncheon an interesting address was given by Mr. W. C. Beckjord, and Mrs. Carolyn Webber Bixby, New England representative of the Roberts and Mander Stove Company, summarized the results of a 19 point questionnaire which had been sent to all Home Service directors in New England regarding the attitude of the woman customer toward gas and the place of Home Service in a gas company. The comments in regard to gas, as a whole, were favorable, pointing out gas as a convenient, fast and clean fuel, and gas equipment adequate, attractive, efficient, dependable for controls and reasonable prices. The service, they felt, was satisfactory in general and one point was made that women preferred not to have too many people sent on one repair job, preferring one efficient call. Answering a question of competitive fuels, the customers' comments were that electricity was the only real competitor; coal being slower, requiring more attention and causing more dirt, while oil caused too much care and trouble, gave poor browning in baking and the odor and smoke were objectionable. The Home Service questions stated a noticeable increase in calls from customers for assistance in the use of appliances.

Addresses were also given by Messrs. Arthur Hewitt and I. T. Haddock who stressed and endorsed the importance of Home Service work.

Edward G. Twohey, Merchandise Manager, Lawrence, Mass., Gas and Electric Company, showed conclusively the reasons why it is to a combination company's advantage to push gas for cooking, water heating and refrigeration. His paper, "Pushing Gas in Combination Companies," was enthusiastically received.

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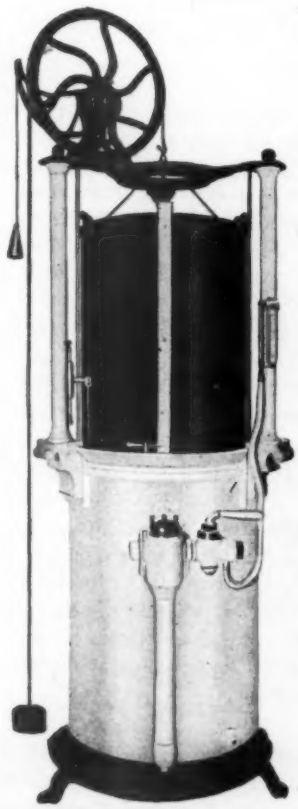

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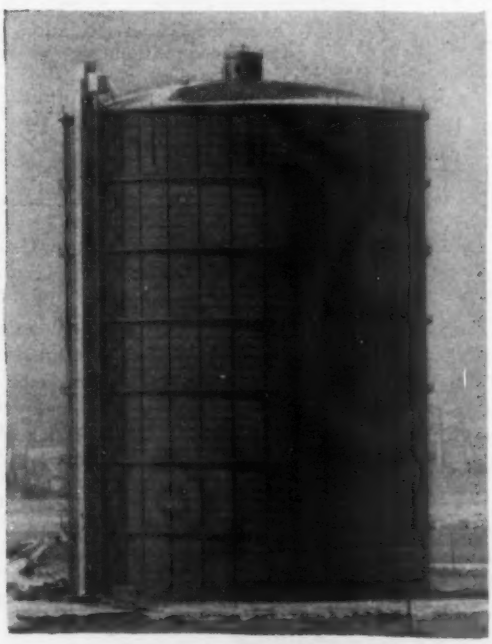

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Personals

Dana D. Barnum, president of the Boston Consolidated Gas Company, has been elected to the Board of Directors of the American Standards Association on the nomination of the American Gas Association, one of the Member-Bodies of the Standards group. Mr. Barnum is a past-president of the American Gas Association and has been president of the Boston Consolidated Gas Company since 1921.

The American Standards Association is a federation of 38 technical, trade, and governmental bodies engaged in a joint effort to promote the establishment of a unified body of national technical standards for industry.

F. W. Crone has been placed in charge of the publicity and editorial activities of the gas and electric companies affiliated with the Consolidated Gas Company of New York, according to a recent announcement by Oscar H. Fogg, Vice-President.

He will be Director of the Editorial Bureau of the companies, and **Howard F. Weeks** will be Assistant Director.

Mr. Crone has been connected with the New York Edison Company for more than four years, in charge of advertising and publicity for the group of electric companies. He was at one time Director of the New York State Committee on Public Utility Information, and previous to this was a reporter, political correspondent, and editorial writer on the New York Tribune.

Mr. Weeks has been Assistant Advertising Manager of the Consolidated Gas Company for the past three years. He was formerly Editor of the American Gas Association Monthly.

H. W. Olcott, Jr., formerly advertising manager of the Public Service Co. of Indiana and Central Indiana Power Co. at Indianapolis, Ind., has been appointed advertising manager of the Philadelphia Gas Works Co., succeeding W. F. O'Donnell, who recently resigned.

Mr. Olcott entered the utility business in 1926 as assistant publicity director of the Northern Indiana Public Service Co. of Hammond, Ind., later occupying a similar position with the Midland United Co. in Chicago. He became advertising manager of the Public Service Co. of Indiana and other subsidiaries of the Midland Co. at Indianapolis in 1929.

Logan W. Cary, president of the Consolidated Gas Service Co., Oklahoma City, Okla., who was appointed temporary receiver of that company by Judge Edward S. Vaught of the federal court some time ago, was confirmed as permanent receiver on January 23.

Miss Jean E. Mutch has succeeded to the post of Home Service Director, B.C. Electric Railway & Gas Co. Ltd., Vancouver, B.C., left vacant by the sudden passing of Miss Read, who for some years was an exceedingly popular lecturer and director for that company.

Miss Mutch is working hard to make the Vancouver cooking school and lectures on home service for the company exceedingly attractive. She conducts special cooking classes each Friday afternoon and evening at the company's auditorium.

Guy W. Talbot, for the past 23 years president of the Portland Gas & Coke Company of Portland, Oregon, and the Pacific Power & Light Company, resigned February 25th and will be succeeded by Paul B. McKee, ex-Vice-Pres. and Gen'l. Mgr. of the California-Oregon Power Company. For a number of years Mr. McKee has been President of the Brazil Electric Company, a subsidiary of the American & Foreign Power Company.

It was a real shock to the companies' officials when Mr. Talbot's resignation was announced, for he had made himself greatly beloved by all employees as well as the public, and his leaving was a real bereavement.

The reason for his resignation is poor health, which had been greatly aggravated by prevailing business conditions.

Mr. Talbot however will remain in touch with the Gas industry, as he succeeds Chas. F. Adams as chairman of the Board of Directors, which position Mr. Adams has held for 23 years.

Mr. Talbot was also President of the Northwestern Electric Company and of the Inland Power & Light Company, which company built the Ariel hydro-electric project on the Lewis River, at a cost of eight million dollars.

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Convention Calendar

March

16 New Jersey Gas Association, annual convention. Camden, N. J.

27-31 American Society Civil Engineers. Miami, Fla.

April

10-12 Mid-West Gas Association, annual convention. Des Moines, Iowa.

21 Maryland Utilities Association. Lord Baltimore Hotel, Baltimore, Md.

27-28 Missouri Association of Public Utilities. Jefferson Hotel, St. Louis, Mo.

May

2-4 A.G.A. Southern Regional Sales Conference. Washington, D. C.

2-4 Southern Gas Association, annual convention. Shoreham Hotel, Washington, D. C.

2-5 Chamber of Commerce of United States. Washington, D. C.

May 30 to June 2, Institution of Gas Engineers (British) Liverpool, England.

September

18-19 Canadian Gas Association, annual convention. Ottawa, Can.

Week of September 25, Annual Convention of American Gas Association. Chicago, Ill.

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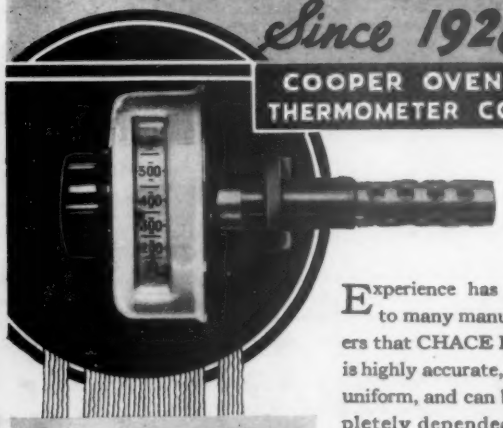

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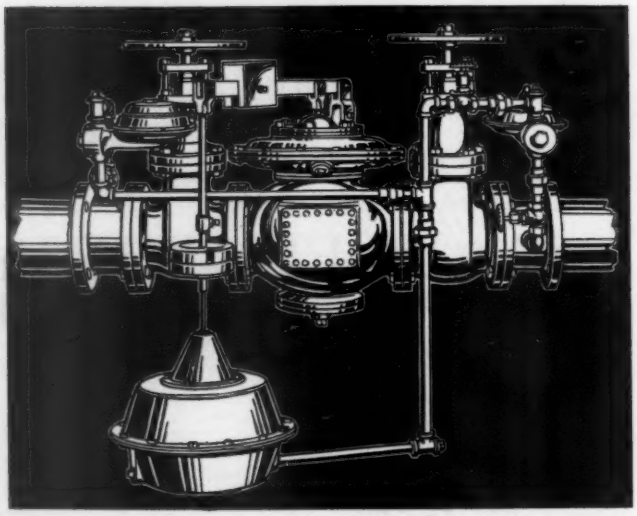

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Index To Advertisers

Alpha Lux Co., Inc. 47
American Meter Company 6
American Stove Company 2
Andale Company 48

Byllesby Engineering & Management Corp. 47

Cast Iron Pipe Research Ass'n. .....Fourth Cover
Chace Valve Co., W. M. 48
Chaplin-Fulton Mfg. Co. 4
Connelly Iron Sponge & Governor Co. 49
Connersville Blower Co., Inc. 4
Cruse Kemper Co. 4

General Motors Truck Co. 8

Hotel William Penn 50

Improved Equipment-Russell Engr. Co. 49
Isbell-Porter Co. 47

Lambert Meter Co. 47
Lavino & Co., E. J. 50

Mohawk Asphalt Heater Co. 49

Precision Thermometer & Instrument Co. 5

Reynolds Gas Regulator Co. 48
Robertshaw Thermostat Co. .....Front Cover
Roots-Connersville-Wilbraham 4

Safety Gas Main Stopper Co. 50
Semet Solvay Engineering Corpn. 46
Sprague Meter Co. 5
Stacey Bros. Gas Construction Co. 45
Superior Meter Co. 45

Unger, John S. 49

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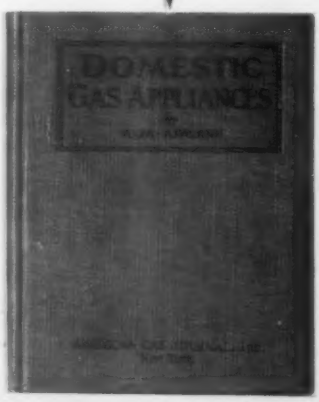

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CONTENTS

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VI. Appliance Installation
VII. The Gas Range
VIII. Gas Range Accessories
IX. The Gas Water Heater
X. Gas for Househeating
XI. The Househeating Furnace and Accessories
XII. Boiler Selection
XIII. Principles of Determining Heating Costs
XIV. Space Heaters
XV. Incinerator and Laundry Equipment
XVI. The Gas Refrigerator
XVII. The Future of Gas Utilization
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